The uptake of Educational Technology in South African Higher Education: A Study of the Context that conditioned Emergency Remote Teaching in the Pandemic

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Abstract

The study explores the enablements and constraints in the uptake of educational technologies in the South African higher education system. This is a multiple institutional study which considers the differentiated nature of higher education institutions in South Africa and reflects on the implications of this for the use of educational technology (EdTech). EdTech is seen as an important aspect of 21st century education. As an established practice in many universities it has made a significant impact on teaching and learning practices. However, EdTech is often presented as a panacea to educational problems and implemented without consideration of the contexts in which it is used.

Data was collected from the educational technology units of 22 of the 26 public higher education institutions and the main sources of this data were an online survey questionnaire related to the uptake of educational technologies and semi-structured interviews.

For the research analysis, Archer's analytical dualism and morphogenetic cycle provided a framework with the understanding that a social phenomenon such as EdTech emerges from a complex interplay of multiple mechanisms rather than through simple unidirectional causality. The framework directed me to analyse structure, culture and agency as separate entities allowing an understanding of the complex and rapidly growing phenomenon of EdTech. Analytical dualism provides guiding principles on how agential actions, structural resources, and cultural practices emerge and allows an understanding of how agents experience and respond to structures and cultures in social fields, for example, the uptake of EdTech for teaching and learning. The morphogenetic cycle reveals the historical nature the EdTech uptake with events happening over a period of time so that past events, which possess structural and cultural mechanisms, condition agency in socio-cultural interaction.

The study identified several mechanisms enabling and constraining the uptake of EdTech, and while the findings are not exhaustive, they do indicate important enablements and constraints which the sector would do well to consider as it enters

a post-pandemic phase. The data was collected prior to the pandemic and thus provides an understanding of what allowed for the uptake of EdTech when face-to-face teaching and learning was the norm. While the pandemic resulted in a rapid pivot to Emergency Remote Teaching (ERT), and fundamentally changed the face of EdTech in the South African higher education sector and around the world, the findings of this study remain pertinent.

Archer argues that when a new person or structure is introduced, it occurs within a pre-existing context and so what emerges should not be seen to be simply caused by that new person or structure. Rather, its emergent properties are exercised within the conditioning effects of the pre-existing structures, cultures and agents. The Covid-19 virus brought about significant effects around the world, but it would be a mistake for us to assume that the effects were the same across different national higher education systems or even across different universities within a country. For us to understand both what occurred during the pivot to ERT and to consider the implications of this for the future of EdTech, it is imperative that we understand the pre-existing conditions in which ERT was implemented. This thesis offers a rich picture of these pre-existing conditions.

Key findings include the extreme extent to which universities differed in their resourcing and uptake of EdTech prior to the pandemic. In some universities, there were well-resourced EdTech centres while in others, the implementation of EdTech was seen to be the responsibility of the IT department. Even where EdTech staff were employed, the nature of this employment varied greatly. In some cases, such staff were seen as educational experts who were hired as academics and often worked within academic development centres. In other cases, such staff were employed as administrative support staff. Another difference pertained to whether they were employed on contract (often funded through project funding) or on a permanent basis. These differences in employment and the positioning of the EdTech staff were seen to greatly condition the levels of credibility they enjoyed and the kinds of work they could undertake. If they were employed as support staff, they were more likely to be seen to be responsible for providing academics with end-user technical assistance. If they were employed as academics, they were more likely to be seen to

be responsible for providing pedagogical and curriculum development support in using EdTech for teaching and learning.

Another set of findings related to the extent to which EdTech was seen to be valued within each university, such as by being included in promotions criteria, mentioned in institutional strategies, and supported by university management. Where this was not the case, this constrained the uptake of EdTech. In all cases, the EdTech staff reported working almost exclusively with academics who sought to develop their EdTech capability on a voluntary basis because it aligned to what Archer terms their 'personal projects'. At times a departmental champion, especially in the form of the Head of Department as a social actor, led to EdTech uptake spreading across the academic body. There was evidence of some resistance to the use of EdTech and a great deal of anxiety among some academics. This was seen to be implicated in concerns that at times EdTech was seen to be a 'dumping ground' and the Learning Management System positioned simply as a repository of materials.

Many academics reported being pushed by their students to integrate more technology in their teaching. Many students seem to be adept at using technology and can see its potential pedagogical benefits and so placed pressure for this to be increased. There were however concerns that the notion of 'Digital Natives', that is millennial students who were born into a technological era, was only a partial picture of the student body. The 'Digital Divide' meant that there was highly uneven access to hardware, data, bandwidth, and technological literacies among the student body. For many students, their only access to technology was while they were physically on campus, a finding that was to have extreme implications for the pivot to ERT.

This research will be valuable to the field of educational technology and enhance the understanding of what is needed to enable the uptake of educational technologies in higher education teaching and learning in pedagogically sound ways. As the sector responds to the pandemic and reflects on lessons learned during this time, it will be important to look to the conditions outlined in this study as they continue to enable and constrain the uptake of educational technology.

Abstract

Ucwaningo olwethulwe yindlela elandela imigomo ka-Bhaskar kanye no-Archer yesayensi yezenhlalo ehlola ukuze inikeze incazelo yokuvumeleka nezithiyo ekuthathweni kwezifundo ezisekwe ubuchwepheshe besimanje. Lolu ucwaningo lwezikhungo eziningi zemfundo ephakeme, futhi inhloso yalo enkulu bekuwukuhlonza ukuthi kwavela kanjani izindlela ezehlukene ukuze kuvunyelwe futhi kuvinjwe ukusetshenziswa kobuchwepheshe bezemfundo ezikhungweni zemfundo ephakeme ezehlukene eNingizimu Afrika. Izifundo ezisekwe ubuchwepheshe besimanje (EdTechs) ibonwa njengezici ezibalulekile zemfundo yekhulu lamashumi amabili nanye (21st century), futhi njengomkhuba osunguliwe emanyuvesi ibe nomthelela omkhulu ekufundiseni nasekufundeni. Kodwa-ke, i-EdTechs ivame ukwethulwa njengekhambi ezinkingeni zemfundo futhi yacwaningwa ngaphandle kokucabangela izimo lapho isetshenziswa khona. Ngenxa yalokho, kwaba nesidingo sokuqonda kangcono ukuthi ukutholwa kwayo kwehlukaniswa kanjani phakathi nohlelo lwemfundo ephakeme olungalingani emaNyuvesi ahlukene.

Ubufakazi buqoqwe ezingxenyeni zobuchwepheshe bezemfundo zezikhungo zemfundo ephakeme zikahulumeni ezingamashumi amabili nambili (22) kwezingamashumi amabili nesithupha (26) futhi imithombo eyinhloko yalobufakazi kwakuwuhlu lwemibuzo lwenhlolovo oluku-inthanethi oluhlobene nokusetshenziswa kobuchwepheshe bezemfundo kwase kulandela kanye nezingxoxiswano ezihlelwe kancane.

Ukuze kuhlaziywe ucwaningo, i-analytical dualism ngokuka-Archer kanye nomjikelezo we-morphogenetic (uzalo kabusha) unikeze uhlaka lokuhlaziywa kokutholwa kobuchwepheshe bezemfundo njengokusebenzelana okuqhubekayo phakathi kwezifundiswa nabasebenzi bomnyango bobuchwepheshe besimanje (EdTech staff).

Ekuhlaziyeni, ngixoxa ngokuthi uhlaka lungiqondise kanjani ukuba ngihlaziye isakhiwo, isiko kanye nokwenza kwabantu njengezinhlangano ezihlukene nokuthi kungani lolu hlaka lufaneleka ukuze siqonde lesi simo esiyinkimbinkimbi nesikhula ngokushesha sezemfundo zobuchwepheshe besimanje. Ubumbaxambili bokuhlaziya buhlinzeka ngohlaka oluvumela

abacwaningi ezimweni zomphakathi ukuthi babone futhi bahlaziye izindlela ezikhiqizayo neziyisisekelo, okuhlanganisa izindlela zokwenza ngokusebenzisa ukuxhumana komphakathi. Iphinde inikeze izimiso eziqondisayo zokuthi ezinye izenzo zokwenza komuntu kanye nemikhuba yamasiko zivela kanjani kanye nokuqonda ukuthi abenzi nabasebenzi bezemfundo, nokuthi abhekana kanjani futhi asabela kanjani ezakhiweni namasiko emikhakheni yezenhlalo, isibonelo, ukutholwa kwe-EdTechs ekufundiseni nokufunda.

Ngaphezu kwalokho, umjikelezo we-morphogenetic wembula ubunjalo bomlando ukuthathwa kwe-EdTechs nezenzakalo ezenzeka esikhathini esithile ukuze izehlakalo ezidlule ezinezindlela zesakhiwo nezamasiko zibekezelele izenzo zezifundiswa njenge-ejensi ezovela ekusebenzelaneni kwezenhlalo namasiko. Izakhiwo ezivelayo zesakhiwo, isiko kanye nezabenzi zibonwa njengezindlela ezibalulekile ezivumela futhi zibambe iqhaza ekuthathweni kobuchwepheshe bezemfundo ekufundiseni nokufunda yizifundiswa.

Ngakho-ke, ucwaningo luveza ukuthi kungani ukuthathwa kunezindlela ezivumelayo neziphoqayo futhi ukuxhumana phakathi kwesakhiwo, isiko kanye nomenzi kudala ukucabangela kwesimo okungaba okuncomayo noma okuphikisanayo ngokwemvelo. Imvume yokulandelana kwesimo yencazelo yokuthi kungani kunokuhlangenwe nakho okuhlukile ekuthathweni kwalawa ma-EdTech avela ezikhungweni ezehlukene esimweni semfundo ephakeme yaseNingizimu Afrika.

Lolu cwaningo luzobaluleka emkhakheni wezobuchwepheshe bezemfundo futhi luthuthukise ukuqonda kwalokho okudingekayo ukuze kusetshenziswe ubuchwepheshe bezemfundo ekufundiseni nasekufundeni imfundo ephakeme.

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Chapter 1: Introduction

1.1 Background to the study

In the last two decades, educational technology has become almost ubiquitous in higher education around the world. Researchers in the field have seen technology being used for offering entirely online courses, we have seen the rise of Massive Open Online Courses (MOOCs), and we have seen technology allowing for far more interactive online engagement than when it was first introduced into the HE sector. Initially, educational technology simply meant that content could be uploaded online for easy access, later videos and audio-recordings were included as well as narrated PowerPoints, and other digital means of transferring information. Recently, the growth in uptake and capability has been exponential and it has become increasingly sophisticated. Technology allows for demonstrations of processes beyond the scope of the average university classroom or laboratory. For example, students can now participate in immediate response online quizzes and 3D modelling online. They can also engage in projects across the world. The innovations in technological possibilities are seemingly limitless.

Technology has had an enormous impact on higher education beyond teaching and learning. It is also being used to manage the administration of teaching and learning in multiple ways, from student applications and admissions, to credits tracking as well as fee and deadline communications. It is also used to track data relating to students' interactions with the institution, from attendance to assignment submission, so that institutions are better able to monitor student progress. Many universities now have automated systems whereby students who are underperforming or have challenges can be flagged and directed towards support options. This is particularly important given the massification of higher education, whereby student numbers have increased enormously and the student body has become far more diverse making it vital to track individual student progress. In addition, many of the students entering university now are first generation learners, who may have particular learning needs, which technology can help address.

But no phenomenon happens in a vacuum. The uptake of educational technology, like any other social phenomenon, can be enabled or constrained by the national and/or institutional context, such as the cost of hardware, the extent of internet access, the focus on both

technology and education within national policy and funding processes. It can also be enabled or constrained at an institutional level, such as by the extent to which resources are available and the extent to which technology is perceived to be central to the institution's teaching and learning strategies. For these reasons, it cannot be assumed that global trends in educational technology will play out in the same way across countries or even within the educational sectors of one country.

This study explored the ways in which educational technology had been taken up in the 26 public universities in South Africa. To map out the ways in which technology was being used for educational purposes in these institutions, this large-scale study used online surveys and interviews from participants across this sector. In particular, the study sought to understand how technology was conceptualised by those tasked with implementing it for education and the implications of these conceptions for the uptake of educational technology. The data comprised a survey and interviews, as I explain in detail in Chapter 4. The survey was extensive and was comprised of 11 close-ended and 14 open-ended questions. It was completed by 56 staff members working in one or other aspect of educational technology in South African universities. The survey was followed up by interviewing 24 of the survey respondents to gain a deeper understanding of how educational technology was understood and used within each university.

Drawing on the work of Archer (1995), social realism demands that scholars search for a much more nuanced, complex understanding of the many mechanisms that might intersect to lead to a phenomenon occurring in the social world. When applying Archer's (1995) social realism to research, this means trying to understand what is happening to both 'the people and the parts'. Archer (1995) argues that all social events and experiences need to be understood from the workings of both 'the people and the parts'. The people comprise the agency of individuals and groups and their ability to act. Their ability to act is conditioned by 'the parts', that is, the domains of structure and culture. While this is explained in more detail in Chapter 3, it may be useful to briefly discuss the complexity of the mechanisms at play which condition the uptake of technology in an institution.

As a social realist study, this study investigated the uptake of educational technology with an understanding that any social phenomenon occurs through the interplay of multiple

mechanisms, that is, events and experiences in the world happen through a complex interaction of drivers and forces. There is an understanding that simple causal accounts, where one thing is seen to determine another thing, are reductionist and simplistic.

In the domain of structure, the concern is with the mechanisms, in terms of resources, institutions, policies, and so on, that make it more likely that educational technology is implemented or which of these mechanisms make it less likely. There is thus an understanding that structural mechanisms can both enable or constrain the uptake of educational technology. In the domain of culture, my interest is in the understandings, beliefs, discourses, and values around the use of educational technology with the understanding that the belief systems that people draw on when they talk or think about educational technology will either enable or constrain its uptake. These domains of structure and culture together comprise 'the parts' and they are interacted with by 'the people' (Archer, 1995).

The third domain that any social realist research needs to consider, therefore, is the agential domain, which considers how individual people may have personal projects around the phenomenon of study, in this case, educational technology. Their personal project may enable the uptake of educational technology or may constrain it. Certain agents, who are known as social actors (Archer, 1995), may have more institutional power to enable or constrain the uptake of educational technologies, such as a Deputy Vice-Chancellor: Teaching and Learning, who may write a policy that encourages academics to use technology in their teaching, or a Vice-Chancellor who may approve a policy that suggests that integrating educational technology is important to achieve academic promotion. Even at the level of what Archer (1995) calls primary agency, for example, an individual academic who might not have much institutional power, however, if he/she has a personal project that regards educational technology as a useful means of improving teaching and learning, then he/she might invest time and energy in educational technology. As a result, his/her personal project might enable its uptake. In contrast, an individual academic might see educational technology as educationally problematic or might be very intimidated by the technology, which might constrain the uptake of educational technology in his/her own courses because of his/her personal projects.

As I argued throughout this study, it was with this social realist frame that the uptake of educational technology needed to be understood. Educational technology emerges from the interplay of all sorts of mechanisms, some of which might complement each other and strengthen each other, some of which might contradict each other and, therefore, weaken each other. It is within such an understanding that this study explored the uptake of educational technology in South African higher education.

1.2 Personal experiences as impetus for the study

My interest in educational technology emerged from my own role as an educational technology support staff member. I work as an instructional designer in an EdTech[1] (educational technology) support department, the Department for Education Innovation, at the University of Pretoria. As a graduate of a master's programme in computer-based education, I entered the EdTech support department determined to incorporate my educational background and instructional design skills to empower academics in their uptake of educational technologies for teaching and learning. I was committed to the enhancement of teaching and learning through the use of educational technologies.

As an instructional designer, I advise academics in using educational technologies in what are hopefully pedagogically sound ways and I provide ongoing support to academic staff with regard to the Learning Management System (LMS) and within any technology enabled environment. Such support for e-learning is an absolutely necessary resource, and entails engaging with academic staff about the appropriate use of EdTechs (Hopkins, 2015; Czerniewicz & Brown, 2009; Mistri, 2017).

I was increasingly aware of the idea that educational technology could solve all sorts of educational issues, however, I was concerned about some of the claims in this regard. Although educational technologies may have the capability to positively transform teaching and learning (Ng'ambi & Bozalek 2015), I began to worry about the idea that the use of EdTech could address systemic problems of poor retention and throughput. Veletsianos (2013)

[1] As I discuss later in Chapter 5, Section 5.5, the terminology around EdTech practitioners such as myself varies greatly. While some institution uses the term 'instructional designer', others use 'educational technologist' or 'educational technology staff developer' and other variations. I use the term EdTech to refer to the use of educational technology broadly and EdTech staff as anyone whose main institutional role is to support the use of educational technology.

cautions that student learning needs and experiences should be taken into account when weighing up technological affordances. While Information Communication Technologies (ICTs) offer possibilities for the education arena, the need to drive technologies towards the context-specific pedagogical practices seems vital (Howard & Maton, 2011). Institutions have to take note of the knowledge goals and the nature of their student body in all pedagogical decisions (Bozalek, 2015). This would require that educational practices are promoted which are relevant, and which take into account the technology hardware owned by students or available in the institution, alongside issues of bandwidth, for example.

Through EdTech support sessions with academics over the years, I have learnt that the use of EdTech and the best ways to integrate ICT for teaching and learning varies between academics and across disciplines. I was interested in how and why some academics were drawn to the use of technology in their teaching and engaged extensively with us to select the best tools for their intended learning outcomes, while others had no contact with us at all. I had an interest in knowing what it was about individual academics or the structures available in institutions, nationally and globally, and the culture within these universities, nationally and globally that made educational technology used in some courses but not in others.

When I first commenced this PhD journey, I took note of the concern in an NRF report (Deacon, Osman & Buchler, 2009) that 99% of educational research in South Africa (theses and publications) comprised either small-scale or case study research at the classroom, school or institution level. The authors noted that this educational research failed to map out bigger systemic level issues. While small-scale studies and case studies can be powerful in their own right, the report argued that there was a need for studies that could help researchers to understand a phenomenon at a national level and, for that reason, I chose to research EdTech uptake at a national level.

I undertook this study as part of the NRF funded institutional differentiation group (NRF grant number: 87646). As a group of seven scholars within this project, we investigated the entire public higher education sector focusing on different phenomena, such as plagiarism (Mphahlele, 2019), supervision (Motshoane & Mckenna, 2014), funding (Moyo, 2018), research culture (Muthama, 2019), curriculum structure (Ncube, 2021), and, in my case, educational technology. While undertaking research with such a large scope allowed me to

develop a keen sense of the conditions enabling and constraining the uptake of EdTech at a national level, this process was complex in terms of ethical clearance and data collection, as is discussed in Chapter 4.

1.3 The South African higher education sector

With the fall of apartheid, the Department of Education[2] proposed a single structure for higher education that would bring equality to the South African higher education system. This proposal led to a massive rearrangement of the higher education sector. Prior to the new dispensation, there were 36 racially-divided institutions. Institutional differentiation was originally formulated and implemented with the goal of serving the racist agenda of the apartheid government (Cloete & Fehnel, 2002; DHET, 2014). This segregation led to an uneven distribution of funds and resources by the state to different institutions. The black institutions remained poor and faced restrictive state control while the white institutions benefited immensely from government funding and enjoyed far more institutional autonomy (DHET, 2014). Although the racist funding of the past ended in 1994, the disadvantaged conditions continue because of a number of contextual issues, including the uneven distribution of resources (DHET, 2014), which may be just one of the constraints hindering technology uptake.

Given the structure of imbalanced racial educational access to previous advantaged and disadvantaged institutions in South Africa, there was a great concern on inclusivity after the first democratic election (Bozalek & Boughey, 2012). The dissolution of the apartheid system and the restructuring of the higher education system post-1994 opened doors for wider access to tertiary education (Naidoo & Naidoo, 2011). The restructuring involved long negotiations with major stakeholders in HE institutions, with some of the current traditional universities rejecting the propositions (for example, the one previously advantaged institution rejected merger with one historically-disadvantaged institution). Many universities (mostly historically-disadvantaged) and former technikons were merged into larger institutions.

[2] The Higher Education part of this department has now split off to form the Department of Higher Education and Training (DHET), and the Department of Basic Education now deals with schools only.

South Africa today has 26[3] government-subsidised, public universities. They are governed by the Higher Education Act, 1997 (Act No. 101 of 1997), however, they remain relatively autonomous with their own reporting structures. These institutions offer various types of undergraduate and postgraduate programmes across a range of vocational and professional fields, alongside formative qualifications such as the Bachelor of Arts or Bachelor of Sciences. There is also a growing private higher education sector though these institutions are not permitted to be termed 'universities'[4].

Public universities in South Africa are differentiated into three types, namely, traditional, comprehensive and universities of technology. The eleven traditional universities focus on formative and professional qualifications in the form of degrees. They also have the largest number of postgraduate programmes and produce the bulk of the nation's research output. The six universities of technology focus largely on vocational qualifications in the form of diplomas, though this is rapidly changing as these institutions, previously known as technikons, offer an increasing number of degree programmes and postgraduate studies. There are also six comprehensive universities, which offer a mix of formative, professional and vocational diplomas and degrees, and were largely formed through the merger of traditional universities and former-technikons.

Despite a changed funding formula and restructuring through mergers, there is still racial discrimination and social injustice within these institutions (Council on Higher Education, 2013). The White Paper on Post-School Education and Training (2013:28) states that 'discrimination, particularly regarding racism and sexism, continues to be pervasive in South African universities, as it is in broader society'. Unless researchers identify and address the underlying mechanisms emerging as these discriminating issues, we are likely to experience challenges in implementing innovative ways of teaching and learning, including with the use of educational technologies.

[3] After the mergers, the 36 universities were re-formed as 23 institutions. This number of 26 includes the two newly-formed universities, namely, Sol Plaatje University and University of Mpumalanga, and the un-merging of MEDUNSA from University of Limpopo, to form the Sefako Makgatho Health Sciences University.

[4] This controversial legislation may change as the private sector grows and offers more postgraduate qualifications and begin to produce research.

South African universities have an obligation to provide quality education (Bozalek, 2015). However, the institutions' differentiated positions, including historical background and uneven access to physical resources is often not taken into cognizance in this obligation. These institutions often have different characteristics, for example, a previously-white traditional university does not carry the same economic burdens as a historically-black traditional university (Ng'ambi & Bozalek, 2015). Although under-resourced institutions are a legacy of the apartheid regime, they serve (even at present) an almost entirely black African student body, often coming from extremely impoverished backgrounds. The lack of resources in these institutions tends to have an impact on the uptake of educational technologies (Louw, Brown, Muller & Soudien (2009). There are thus no easy classifications of institutional type and history, and each institution may have different enabling or constraining factors emerging from its own history and context.

The mergers of institutions also brought many changes to the governance structures and physical structures of institutions. Additionally, the transition to democracy led to the massification of student intake (Naidoo & Naidoo, 2011) and a shifting of the demographics of the student body (Cooper, 2015). This may have prompted some institutions towards the expansion of technology use to enhance teaching and learning, alongside the global drives to introduce such technologies in education. Consequently, academics were expected to adapt their teaching practices (DoE, 2004) to accommodate the demands, trends and developments brought about by the use of educational technologies and to simultaneously accommodate the large and increasingly diverse student intake. However, in this pursuit to adapt to the growing number of students and the increased diversity of the student body[5], there has not been any sector-wide research into how academics have taken up educational technologies (Czerniewicz, Ravjee & Mlitwa, 2006).

ICT trends challenge academics to improve and enhance their teaching through the use of online platforms (OER Africa Report, 2015). As a result, there is pressure on academics to ensure that they stay current with emerging technologies. While the 'ICTs and higher

[5] Cooper (2015) shows that there has been a 'skewed revolution' in historically-disadvantaged institutions where the student body remains racially and socioeconomically largely homogenous and a 'stalled revolution' in that the rapid changes in the racial demographics of the student body in historically advantaged institutions have plateaued.

education in Africa' report (Moll, Adam, Backhouse & Mhlanga, 2007) identified that most higher education institutions were using ICTs for teaching and learning, however, it was not elaborated whether these educational technologies were used in pedagogically-sound ways.

1.4 The COVID-19 pandemic problem

Having engaged in this extensive study and collected various forms of data across the entire sector, I began the analysis process and started to identify rich findings. I was able to identify a number of mechanisms at play that were either enabling or constraining the uptake of educational technology in pedagogically sound ways, and I was excited about the contribution my PhD could make to the field. But it was at this point that the COVID-19 pandemic struck. The pandemic, as discussed in Chapter 8, meant that the entire face-to-face higher education system came to a halt, and there was a rapid pivot to Emergency Remote Teaching. My data showed, among other findings, that the uptake of EdTech had been very much an issue of individual agency, albeit enabled or constrained by the structures and cultures of particular universities. But suddenly during the pandemic, EdTech became a national and global issue. All classes had to transition to fully online courses, regardless of the context or the interests of individual academics.

This situation put my PhD in an extremely vulnerable and precarious position for two related reasons. Firstly, as I work in educational technology, I had to put my PhD on hold while I was working night and day to help academics, including those who had resisted the use of educational technology up to this time, to very quickly put all of their courses online. No one knew how long this pandemic was going to last, so working long hours, helping academics trying to set up institutional strategies, collaborating with other universities, negotiating with data service providers, all added an enormous complexity to the job profile of anyone involved in the field of educational technology. And, in terms of the PhD, it meant that my study had to be on hold for what I hoped was going to be a matter of weeks or months, but which turned out to be two years. Once the demands of remote teaching had settled to some extent, and lecturers became more accustomed to Emergency Remote Teaching, in the latter half of 2021, I could continue with my PhD studies.

Secondly, I was faced with the enormous concern that my PhD data described the context of the uptake of educational technology prior to COVID-19; a context which now no longer

existed. The data had become dated thanks to the structural mechanism of the COVID-19 virus, which entirely upended the ways in which traditional educational technology was used. So, I feared that my study was no longer valid and that the research contribution no longer applied.

However, focusing once again on the social realist framework underpinning the study, it became clear that in fact there remained much that the study could offer researchers and perhaps even more so as researchers tried to make sense of what had happened with regard to the use of educational technology during the COVID-19 pandemic, and where educational technology would be positioned going forwards. Archer's (1995) social realism suggests that change (or lack thereof) happens through a series of cycles (which is described in more detail in Chapter 3). Firstly, T_1 is the conditioning situation before a new agent enters the realm or before a new mechanism comes into play. T_1 is about identifying the structural and cultural conditions before something happens (a new cultural or structural mechanism comes into play, or a new actor enters) because that 'something' is conditioned by the context of T_1. Social realism demands a full understanding of the structural and cultural conditions before something happens if how that thing happened is to be understood. Archer (2000) raises a concern that where educational research only looks at a phenomenon and not at the conditions in which the phenomenon occurs, there is an epistemic conflation and, more precisely, there is upwards epistemic conflation. An upwards epistemic conflation is when there is a (mis)understanding that whatever has happened, has simply happened out of the blue or just because of the actions of an individual or a particular policy or some other kind of mechanism. Archer (1995) demands that T_1 is analysed in detail, namely, what were the conditions *before* a policy comes into play, or *before* a person entered an institution, or *before* a pandemic hit, and so on. So, it became clear to me that my PhD was actually a detailed and in-depth look at T_1. In other words, what this thesis presented was a detailed look at what the conditions around the use of educational technology in South African higher education were before the COVID-19 pandemic hit. While the pandemic impacted every country in the world, and universities globally were forced to move their classes online, Archer (1995) argues against simplistic causal accounts across contexts. Such accounts often fail to consider the conditioning effects of context.

Archer (1995) then suggests that after T_1, the conditions before an event, are T_2-T_3. In the case of this PhD, T_2- T_3 was the period of the actual COVID-19 pandemic. The response to the pandemic by South African universities cannot be understood only by looking at what happened during the pandemic, rather what is needed, according to Archer's (1995) framework, is a detailed understanding of the conditions into which the pandemic entered if we are to understand how these conditions then shaped the ways in which the institutions responded. Archer (1995) suggests that the final stage is T_4, which is where it can be assessed whether or not change has occurred. T_4 then becomes the T_1 of the next cycle and provides the sets of conditions within which new 'people and parts' can enter and which then conditions those 'people and parts' (Archer, 1995). In the case of this study, I offered a study of T_1, thereafter in T_2 to T_3, the microscopic virus that entered the cycle was the profoundest new mechanism affecting the research phenomenon of EdTech uptake.

Although I was concerned that my data described a situation that no longer existed in quite the same form, this could be reconsidered in the light of this study offering insights into T_1. That is, this study could now be understood as a detailed picture of the conditions before the COVID-19 pandemic led to universities shutting down and academics having to rush to Emergency Remote Teaching. By understanding how different universities responded to the pandemic and how they were able to successfully or less successfully use technology to overcome the constrictions of lockdown, this study provided a very rich and nuanced picture of that context into which the COVID-19 pandemic came as a major mechanism changing the world as it was known.

To help make the connections between this PhD study, as T1, and the emergence of Emergency Remote Learning during the pandemic, I added Chapter 8, which was not in the initial plan for the PhD. Chapter 8 offers a brief introduction to the literature on educational technology use during the COVID-19 pandemic. I endeavoured in this chapter to reflect on the mass of literature that emerged during 2020 and 2021 on the use of educational technology in higher education and to consider how the findings of this study, discussed in Chapters 5, 6 and 7 might have conditioned the ways in which the South African higher education system navigated to Emergency Remote Teaching.

1.5 Thesis roadmap

This thesis commenced with Chapter 1, which provides an overview of the study on how technology has been used globally and the impact it has for teaching and learning. Chapter 1 again highlights on my role as an EdTech staff and how it came about that I undertook this research. The structure of the South African Higher Education sector was introduced and briefly discussed under this chapter.

Chapter 2 engages in a conversation around the conceptual framework of the study. It provides an understanding of the study's context in terms of the literature on educational technologies. This chapter seeks to provide a succinct account of the position with regard to the establishment, support and development of educational technologies in teaching and learning in South African universities. Educational technology (EdTech) became universal in higher education institutions in South Africa (Mlitwa, 2010; Uys, Dalgarno, Carlson, Crampton & Tinkler, 2011; Njenga & Fourie, 2010) and Chapter 2 discusses some of the larger global and then national issues in this regard.

Chapter 3 provides the theoretical framework of the study and extends the understanding of social realism by developing Chapter 1's discussion. The issue of emergence is explained in terms of a depth ontology, and the chapter grapples with how social phenomena are understood and how 'truth' and 'knowledge' are understood in the study. In Chapter 3, the morphogenetic cycle, from T_1 to T_4 is discussed in greater detail and the analytical approach known as analytical dualism is expounded.

Chapter 4 discusses the study's methodology and research design. The realist underpinning of this study demanded a move from describing the rich and varied data to the tentative identification of the mechanisms from which the events and experiences captured in the data emerged. The study attempted to answer the research question, 'What enables and constrains the uptake of educational technologies in South African Higher Education Institutions?' The intent of this study was to understand and identify the conditions that enabled or constrained the uptake of educational technologies at all 26 public higher education institutions in South Africa. As indicated, I endeavoured in this study to illustrate the mechanisms at play across the sector, while acknowledging the specificities of each university. There was thus an awareness that the broader scope came, to some extent, at the

cost of depth. In this chapter, the process of data collection, through survey and interview, and data analysis, through analytical dualism is outlined.

Chapters 5, 6 and 7 discuss the findings from the study. The analysis process allowed me to begin to see how mechanisms conditioned the uptake of educational technology from the different institutions in the South African context. Chapter 5 considers how EdTech staff are positioned within the sector and notes how the differences in EdTech structure seem to be a significant mechanism with regard to EdTech uptake. Chapter 6 focuses on the academics' responses to EdTech and looks at how the EdTech participants understood the reasons for some academics engaging with the use of technology and others resisting it. Chapter 7 offers the findings in relation to students, and reflects EdTech staff's reporting that student demand was a significant mechanism enabling the uptake of EdTech.

Chapter 8 serves as a COVID-19 postscript. This chapter contributes to the study's literature review by specifically addressing the current literature on higher education during the COVID-19 era. This chapter was added in January 2022 to make sense of the implications of teaching and learning disruptions and the move to Emergency Remote Teaching during the COVID-19 lockdown (Mhlanga & Moloi, 2020). I endeavoured to show how mechanisms identified in Chapters 5, 6 and 7 conditioned the uptake reported in this literature.

Chapter 9 offers concluding notes to the study. It provides an overview of the study's limitations and makes recommendations. In this chapter, I also reflect on the study's contribution despite the fraught context in which the study was undertaken.

Chapter 2: Contextual Framework

2.1 Introduction

EdTech is the use of technology for educational purposes. Hodgkinson-Williams and Czerniewicz (2007) define EdTech units as structures which deliver and support educational activities through the use of Information and Communication Technology (ICT). EdTech has become universal in higher education institutions in South Africa, though the extent of its uptake and the nature of its use varies extensively (Mlitwa, 2010; Uys et al, 2011; Njenga & Fourie, 2010). The introduction of EdTechs represents a significant focus in the government's plan for South Africa to advance the quality of teaching and learning across all sectors of the education system (White Paper on e-Education in South Africa (in DoE, 2004). According to the White Paper on e-learning, there is a pivotal need for the education sector to embrace the use of EdTechs to ensure students are prepared for the technological workplace and have ready access to the mass of information available online in multiple forms. As a result, education institutions are considered the mechanism to equip students with the necessary 'global competitive skills' (Mansilla & Jackson, 2012).

ICT trends and developments in institutions around e-learning, online learning, mobile learning, distance learning and using the internet for research have brought multiple changes in the higher education teaching and learning environment. As a result, lecturers are expected to adapt their teaching practices to accommodate the demands brought about by the implementation of educational technologies. Calls for the uptake of educational technology come from various sources, including the government and various bodies such as the South African Qualifications Authority (SAQA) and the Higher Education Quality Committee (HEQC). Among others, demands include the alignment of the curriculum with ICT integration where students are likely to extend their learning through the use of educational technologies and that such changes are incorporated throughout the higher education institutions in South Africa (DoE, 2004). This national implementation goal, specified in the 2004 White Paper, stipulated that ICT should be used to enable access to learning, reverse inequalities, provide opportunities for life-long learning, and improve the quality of teaching and learning. There was thus a strong policy discourse that ICT would provide platforms and opportunities to

connect students and lecturers through the blending of pedagogy and technology, though this has not been articulated in relation to higher education, in particular.

2.2 A brief description to e-learning terminology and usage

There are numerous electronic tools, applications, software, hardware, acronyms and resources related to e-learning. Information and Communication Technologies (ICTs), online learning, e-learning and Learning Management Systems (LMSs) are some of the terms that I used in this study.

The White Paper on e-Education in South Africa (DoE, 2004) describes ICTs as the use of software and hardware to engage collaboratively in obtaining and disseminating information. ICTs include all forms of electronic hardware equipment and software programs, which have the ability to deliver information. Since the inception of ICTs in teaching and learning situations, there has been the emergence of many different forms of software designed to deliver content material and support teaching, learning and assessment in education institutions.

Online learning entails web-based learning, which uses the internet as a vehicle to deliver teaching and learning activities (DoE, 2004). Online learning has grown rapidly and is being used in almost all teaching and learning institutions. In some cases, online learning is used to augment traditional face-to-face lectures, tutorials and practicals. This is known as blended learning. In other cases, modules, courses or programmes are offered entirely online, and the student might never enter the physical university buildings. Where the whole programme is online, this can be a form of distance learning. But there are also many cases where distance learning includes very little technology and relies on paper-based studies posted between the institution and the student. Distance learning is not, therefore, a synonym for online learning.

E-learning is short for electronic learning. This type of learning involves the delivery of teaching and learning using technology. However, it is important to note that national documentation related to various forms of e-learning (such as online learning, blended learning and the use of educational technology in the classroom) stresses that it is not simply the use of technology that constitutes e-learning, but rather it is used in pedagogically sound ways. E-learning uses ICT resources, tools and applications to interact with students and to enable students to access

learning material and activities. E-learning also offers students and instructors opportunities to communicate both synchronously, for example, through instant live chat tools and video conferencing, and asynchronously, for example, through recorded videos, emails and discussion tools (DoE, 2004).

E-learning may be referred to by various terminology, including educational technology, digital learning as well as online teaching and learning. The Joint Information Systems Committee of the United Kingdom defines e-learning as 'learning aided and extended by using ICT' (2011). The term e-learning, thus, to all intents and purposes, covers the use of computers and technology as a means for disseminating knowledge and enabling learning to take place. E-learning may benefit both academic staff and students in that it affords opportunities with which to enhance teaching and learning practices. In some instances, e-learning offers opportunities for students who study part-time to be able to access their course material while off-campus.

E-learning has been referred to by UNESCO (2011) as a key foundation for building knowledge societies. The implementation of ICTs within South African Higher Education (SAHE) is seen as a necessary strategy towards building the knowledge society and the knowledge economy (Shurville, Browne & Whitaker, 2009). The extent to which the global economy relies on technology is a major part of the notion of the 'knowledge economy', whereby the university needs to produce skilled graduates with high levels of technological knowledge for economic growth (Boughey & McKenna, 2021). The need for graduates with technological knowledge is supported by Castells (2009:3) who argues that in the 'current condition of the global knowledge economy, knowledge production and technological innovation become the most important productive forces'.

Alongside the rapid development of LMSs and their capabilities, have been claims that they can significantly reduce if not end issues of unequal access to education. For some, e-learning is seen as a panacea for educational divides and ills. Arguably, the White Paper makes claims along such lines when it indicates that e-learning can:

> … create access to learning opportunities, redress inequalities, improve the quality of learning and teaching, and deliver lifelong learning. ICTs can accommodate differences

> in learning styles and remove barriers to learning by providing expanded opportunities and individualised learning experiences (DoE, 2004:17).

Others, such as Njenga and Fourie (2010), have fervently argued that welcoming the benefits of e-learning should not mean an uncritical view that EdTechs in themselves can resolve educational problems. This warning needs to be kept in mind as many universities offer e-learning through various Learning Management Systems (LMSs).

2.2.1 Learning Management Systems

These systems generally include the formation of an 'online classroom' or virtual space for each module or course where relevant materials, tasks and communication platforms are organised. There are a variety of LMSs available, and the market is huge, namely, $13.6 billion in 2021 (Learning Management System Market Research Report 2022). Blackboard is the most widely used LMS, and is owned by an American company listed on the stock exchange. Along with its LMS, Blackboard.Inc offers a variety of other products to form a VLE, a virtual learning environment. These products include conferencing software and transaction software. The University of Pretoria, where I work, uses Blackboard as its LMS, branded as ClickUP.

While Blackboard is the most widely used LMS in the world (just over 25%), there are many other LMSs available. Many universities make use of a Moodle-based LMS and adapt it for their needs and name it accordingly. The LMS at Rhodes University, where this study is registered, for example, has a Moodle-based LMS that they have named 'RUConnected'. Moodle is a free open-source LMS that is developed and supported by the open source community.

The LMS has been noted as the most commonly used EdTech platform in South African higher education, though its full capabilities and tools are generally not well understood by many academic staff in universities (Padayachee, Van der Merwe & Kotze, 2015). The LMS is regularly used as a repository for content related material rather than as a space for learning and student engagement (Swart, 2017). Various case studies (Czerniewicz, Ravjee & Mlitwa, 2006; Moll, et al., 2007; Mistri, 2017) revealed that LMSs usage for teaching and learning in South African higher education varies within each institution from supported and extensive usage to far less and sometimes to an almost complete lack of technology for teaching and

learning. Adkins (2013) and Mtebe (2015) have nonetheless noted the continuous growth in the use of these platforms.

The LMS can be broadly categorised into three aspects, namely, administration and communication tools, content delivery tools as well as assessment and reporting tools. LMSs offer online teaching and learning spaces, which include collaboration spaces (discussion groups, online support for students), administration spaces (students register for modules, self-assign to group activities, and access their grades), and electronic assessment (quizzes, formative and summative assessment). A number of tools available in the various LMSs allow lecturers and students to interact in different ways with each other, for example, online assignment submission, synchronous chat rooms, discussion forums, just to name a few. The use of LMSs for e-learning also offers opportunities for lecturers to track students' performance. Lecturers can use the early warning systems, for example, the Retention Centre and Learning Analytics (both these are Blackboard facilities for tracking student performances). These early warning systems alert lecturers about students who may be falling behind in their courses. They can be used to improve student learning, for example, meeting with poor performing students to discuss their performance and providing students with additional activities to improve their performance.

Some institutions host their LMSs onsite (on their own servers) while others have taken the cloud platform, that is, their LMSs are hosted by system vendors. These LMSs are used largely to offer and enhance online teaching and learning including electronic assessments (e-assessment), though, it should be noted that some institutions have different systems for their Computer Based Testing (CBT), which are managed separately from their LMSs.

2.3 Educational technologies in South African higher education institutions

Educational technology has been characterised as a tool that changes and improves the nature of teaching and learning (Czerniewicz et al., 2009). However, the necessary resources and support need to be in place for these advances to take effect (Czerniewicz et al., 2009). In South African research, it has been observed that across the differentiated institutions, there is an unequal level of resources, varied understandings of ICTs, and uneven use thereof (Czerniewicz & Brown, 2009; DHET, 2014). A research report conducted by various educational researchers (Moll et al., 2007) provide some findings on the use of ICT for teaching and

learning across South African higher education. However, since technology changes so rapidly, this study no longer reflects the status quo. Nonetheless, in their report, Moll et al. (2007) describe higher education challenges with regard to internet connectivity, software development, and mobile and emerging technologies. This study revealed that all higher education institutions have some degree of ICT infrastructure and connectivity available. However, there are uneven ICT resources along the lines of past inequalities (Czerniewicz, 2009), with previously-disadvantaged institutions having less ICT infrastructure and human resource capacity.

The Czerniewicz and Brown (2009) and Moll et al. (2007) studies also noted that many academics' lack of skills and knowledge in using ICTs is a major constraint to its use for educational purposes. They do, however, report on a variety of ongoing projects that have been implemented in some institutions, promoting the use of educational technologies. These projects are usually undertaken in partnership with the e-learning support units (known in this study as EdTech units) to ensure ongoing support to academics in the use of these educational technologies (Moll et al., 2007). The EdTech units were found in some institutions to be only just established or to be severely understaffed (Moll et al., 2007). Where they were in place, academics were encouraged and supported to embrace the use of EdTechs to support teaching and learning (Kyalo & Nzuki, 2014; Mistri, 2017).

The research report of the study 'ICTs and the South African Higher Education Landscape' (Czerniewicz, Ravjee & Mlitwa, 2006) commissioned by the Council on Higher Education (CHE), indicated that there was a lack of an overarching policy to govern ICTs in higher education institutions. The non-existence of such a policy may have been a constraint for the uptake of educational technology by academics. The 2004 White Paper, while calling for engagement with technology for learning, was seemingly an insufficient driving force for the sector to develop relevant policy, and it left a large gap in its focus only on schooling and TVET type education. However, the CHE ICT Colloquium of 2014, entitled 'Moving the Teaching and Learning System in South African Higher Education into the Digitally-Mediated Era', focused on developing such policy. This discussion involved EdTech units from across South African higher education, including private and distance learning institutions. The focus was on higher education ICT policy development for the realisation of the potential of emerging educational technologies.

However, institutions have a choice to use or ignore educational technologies (Bozalek, 2011), and the institutional context plays a large role in this regard (Mistri, 2017). Bozalek (2015) warns that academics who do not engage in using educational technologies might disappoint the current generation of students who enter HEIs with an expectation to interact with technology for learning. Thus, in this digital age, it seems vital to be using some form of EdTech in a teaching and learning environment. As teaching requires planning, the skill to integrate activities, and an understanding of the target outcomes, it is largely up to individual educators to enhance learning activities in ways appropriate to their specific contexts (Bates, 2015). Some institutions extend teaching and learning through the use of mobile devices as a way to keep abreast with emerging educational technologies. Many students and academics have shown a great desire to use their gadgets to study and work anytime and from anywhere (Horizon Report, 2013), and ICT trends are challenging academics to improve and enhance their teaching through the use of online platforms (OER Africa Report, 2015). As a result, there is a pressure on academics to ensure that they stay current with the pedagogical affordances of emerging technologies. While the 'ICTs and higher education in Africa' report (Moll et al., 2007) identified that most higher education institutions are using ICTs for teaching and learning, it was not elaborated whether these educational technologies were used by all academics, nor was it clear how they were used. While policy discourses suggest that technology is increasingly fundamental to higher education and there is an expectation that all universities will provide opportunities for students to use technology in their studies, it is not clear what makes such uptake likely or unlikely.

The status report on ICTs and Higher Education in South Africa (Moll et al., 2007) further identified that there are some universities that are still in a planning phase for their ICT policies and that there is evidence of uneven institutional support for EdTech staff for training academics in the pedagogical use of ICT. The institutional structures (ICT Infrastructure, policies and governance,) and human capacity (ICT training, experiences of support staff and academic staff in ICT) were in many cases a constraint on the effective use of e-learning for teaching and learning.

Research has also highlighted that some of the challenges to using EdTechs in pedagogically sound ways is the failure to map EdTech resources within the curriculum (Dalziel, 2007).

Instead, the technology becomes something 'added on' as a bonus, rather than as something fundamental in the structuring of the course.

Previous research indicates that there is little evidence that earlier generations of LMS were used in pedagogically thoughtful ways (Britain & Liber, 2004). However, newer versions of these systems have tools which map the use of the LMS within the curriculum to the learning outcomes (for example, the Goals tool in BlackBoard LMS), thus allowing academics to align the desired goals for the courses to the learning activities created online. Such tools hold a future hope for a more scholarly use of these EdTechs.

A number of researchers have argued that the drive to use technology in a course should be pedagogically focused rather than putting technology at the forefront (Laurillard, 2007). To achieve this, it is also imperative that the staff responsible for supporting academics in the use of ICTs for teaching and learning should have educational expertise (Mistri, 2017). Technology by itself does not cause students to learn more or better (Bates, 2015), so using more technology is not a remedy to educational problems. It requires skill to use technology in ways that enable the attainment of learning outcomes. Technology has the potential to improve the quality and accessibility of education but it can equally introduce new problems and hurdles for academics and students. Using EdTechs in learning situations may lead to a different kind of learning opportunities and understanding of information, but this cannot be assumed to be the case simply because technology is present. The scholarly use of technology is needed if it is to lead students to think critically and manage information well rather than reproduce or memorise.

Over and above emphasising the importance of having a sound pedagogical basis to the use of EdTech, the literature also revealed a number of practical challenges in the use of EdTechs in South Africa, including insufficient EdTech support (Mlitwa, 2010), infrastructural limitations, historical backgrounds, organisational differences and educational problems (Bagarukayo & Kalema, 2015). Mtebe (2015) proposes increasing support services to enable the achievement of the goals of the end-users, that is, academics and students.

Czerniewicz and Brown (2005) indicated that constraints in EdTech included a lack of infrastructure in some of the historically disadvantaged institutions, the lack of ICT skills by some staff members, internet connectivity and bandwidth, and the institution restricting sites

for download. There is also an uneven Information Technology resource ownership, ICT usage and varied levels of ICT literacy among students and staff. It was within this context of both fairly dated reports and the concern about very uneven uptake of EdTechs in South African higher education that I embarked on this research.

2.4 Research question

For the study, I wanted to offer a clearer account of the situation regarding EdTechs and a deeper sense of what accounted for the unevenness of EdTech uptake within and between institutions reported by both Czerniewicz and Brown (2005) and Moll et al. (2007). I was, therefore, guided by the research question:

What enables and constrains the uptake of educational technologies?

ICT pedagogical usage in any institution may be driven by the information technology structure (IT personnel), the culture of online teaching and learning (systems used), institution leadership (top management) and the agency responsible to monitor and support e-learning (instructional designers, e-learning specialists, teaching and learning consultants and educational technologists). Thus, for the uptake and use of technology to be effective and beneficial to students as they engage meaningfully with their learning (Saadatmand & Kumpulainen, 2012; Czerniewicz & Brown, 2005), a number of mechanisms need to come into play. Importantly, there needs to be an understanding of the pedagogical issues underpinning the use of technology and the extent to which EdTechs enable epistemological access.

2.5 EdTechs for epistemological access

'Epistemological access' is a term coined by Morrow (2009[6]), a South African education scholar and philosopher. It is also referred to as 'epistemic access' (Morrow, 2009) and entails moving beyond concerns about 'physical or formal access to meaningful access to the "goods" of the university' (Muller, 2012:1). Morrow (2009) argues that students require involvement with academic knowledge to understand how knowledge is produced. While Morrow (2009) suggests that one cannot 'give' epistemic access to a student, guidance is needed to access knowledge. Students need to be inducted into understanding what is valued in the field of

[6] This 2009 text, Bounds of Democracy, is a collection of Morrow's earlier works. His essay on epistemological access was first published in 1994.

study and how knowledge is produced. They then also need to understand the particular, peculiar literacy practices by which the knowledge is communicated (Boughey & McKenna, 2021). Morrow (2009) as well as Rambe and Mawere (2011) accentuate that epistemological access enables students to become critical thinkers and participants in teaching and learning situations, which then affords them access to meaningful knowledge.

Jansen (2001) in Hodgkinson-Williams and Czerniewicz (2007:20) also separates epistemological access from physical access and indicates that teaching towards epistemic access should allow students to access and contribute to knowledge structures? In an educational environment geared towards affording 'epistemic access', Czerniewicz and Brown (2009) argue that students need to be actively engaged in the learning process. Students become active participants in interactive classrooms, but these have to be both designed and facilitated as such. Lecturers can use a variety of available e-learning tools to engage students interactively to acquire knowledge and contribute to knowledge, as epistemological access depends not on the lecturer disseminating knowledge but on efforts of the student (Morrow, 2009). Using EdTech as an intentional part of enabling epistemic access then entails reflecting on the extent of interaction that is afforded by the technology. Lecturers are cautioned not to use e-learning systems as add-ons, for example, only for storing class notes and PowerPoint presentations but rather use a variety of methods and activities for students to engage meaningfully both online and offline. Morrow was concerned that students should be taught not just the content but also the 'how to' for students to become participants in the learning process, for example, know how to write for academic purposes, how to use a stethoscope and how to acquire knowledge using ICT tools.

In an e-learning environment, epistemological access could be about what would add knowledge and value when students are given online activities. The main focus is on the attainment of the planned learning outcomes (Czerniewicz et al., 2006) by using the available EdTech tools, for example, the use of discussion forum tool to extend the debates on critical issues that might have evoked during face-to-face teaching. Rambe and Mawere (2011) also highlight that epistemological access is about making sense of knowledge, thus, students should be guided to use tools that build an understanding of the target knowledge. The focus is then on generating activities, which add to learning how to partake in socially-constructed

knowledge practices. Meaningful learning is enhanced through the appropriate selection and usage of resources (UNESCO, 2012).

E-learning might have an important role to play in enhancing epistemological access in today's era. Morrow suggests the importance of 'the practice of organising systematic learning' through resource-based learning (2007:49) , which can be achieved by re-organising teaching courses through structuring learning into key concepts and ideas. While Morrow (2007?) was referring to face-to-face teaching and learning, the principles remain significant and there is great potential for e-learning in this regard such as software which allows curriculum mapping (to structure and align course outcomes and activities) and produce blended modes of teaching. This does not either suggest that e-learning is the only way to provide resource-based learning for epistemological access nor that e-learning is a fail-proof way to student success. On its own, e-learning is no guarantee of epistemological access. As Hodgkinson-Williams and Czerniewicz (2007) argue, just putting stuff online does not enable learning. It needs to be appropriately designed and to take the context into account. An important aspect of context is the extent to which students and staff have access to technology and have experience in using it.

2.6 Technological literacy and the 'digital divide'

The notion of 'digital natives' (Bayne & Ross, 2011) has become a popular way of describing the youth of today, all of whom seem to have the latest smart phones and are adept at using apps and are immersed in the world of social media. But not all students have smart phones and even those who do, do not necessarily have experience of using a computer, especially for educational purposes. A lack of basic computer skills is identified to be a problem for some students, especially those who come from disadvantaged communities (Czerniewicz & Brown, 2009). While the current student body is all born within the era that designates them to be 'digital natives', it is simply not the case that all students have experience of using technology as a regular part of their lives. This is a case of the 'digital divide' (Ng'ambi et al., 2016; Kilfoil, 2015) whereby the benefits of technology for all aspects of life, including for education, are far more evident in certain countries than in others. The significant economic differences between the Global North and Global South are also evident in terms of access to technology and the consistent availability of electricity and internet coverage.

A study conducted in 2012 in a number of OECD countries showed that successful students were competent mostly because they access resources and information easily and critically. In contrast, the study revealed than the majority of disadvantaged students spent more time on the internet playing games (OECD, 2016) compared to advantaged students who also used the internet for news reading, downloading information, and exploring educational resources. The study did not clarify the types of games played by the disadvantaged students. It can be argued that playing games on the internet can mean the student is engaged in a different form of learning. Game-based learning or gamification is a form of learning that uses computers and instructions to reach desired outcomes. There are various forms of such game-based learning which build on augmented reality. Augmented Reality (AR) is defined as 'taking digital or computer-generated information, whether it be images, audio, video, touch or haptic sensations and overlaying them over in a real-time environment' (Kipper & Rampolla, 2012: eBook). This form of technology learning is multi-sensory, however, it is presently used mostly for visual enhancement. AR enables users to see the physical world surrounded by computer-generated real-life objects. This form of learning gives opportunities to students for immersive learning through online games. The act of playing games is thus not necessarily a concern, but if students do not also see the potential of online resources for educational purposes or if they are unable to access them or make meaning from them, then this can disadvantage them compared to their peers.

Having access to the internet is not a given for all students. The cost of data in South Africa is exorbitant and many students do not have access to hardware either. But even in cases where students have smart phones and access to Wi-Fi, this does not equate to access to education. Access to information without epistemological access is insufficient. Students need to understand *how* to engage with learning materials, on or offline, and *how* to take on the literacy practices of the field.

The issue of computer illiteracy continues to adversely affect some students. It is imperative to fully consider the constraints of students registered in the various programmes that have barriers to accessing e-learning activities. The most common constraints may emanate from their foundation phase education and this is spread across the entire sphere of basic education or schooling (UNESCO, 2007).

Scott, Yeld and Hendry (2007:41) identify that 'students respond differently to different learning conditions'. It is, therefore, of great importance that when technology is used in the teaching and learning process, equity issues must be considered for different student groups, which relates to historical background and issues around computer anxiety and equivalence. A key finding in the OECD report (OECD, 2016) was that students with well-developed reading skills find it much easier to navigate and access valuable knowledge-rich resources using the internet.

2.7 Models of EdTech development

Instructional designing the foundation of e-learning development. The use of effective design principles ensures that teaching and learning is enhanced through instructional experience. The aim of instructional designing for e-learning is to ensure better results are achieved for online activities. Students are thus offered a variety of appealing learning activities for the acquisition of knowledge and skills to harness the true ability of the digital space. EdTech staff are intended to support the system so that the e-learning content is educational, visually appealing and can be delivered (at all times) across all smart gadgets and web platforms. There should be a scholarly knowledge of the principles of e-learning so as to ensure the learning products are instructionally compelling throughout the learning experiences. EdTech staff, sometimes known as Instructional Designers, assist in producing better e-learning activities. Padayachee et al. (2015) challenge all EdTech staff and system designers to focus on the context, capabilities and practices of academics when designing the EdTechs for teaching and learning. Although some LMSs offer academics with a variety of teaching styles and options to personalise their online course spaces, it remains the responsibility of EdTech staff to orientate and familiarise academics with such tool's possibilities. Academics are also challenged to 'adopt transformative pedagogical practices to make effective and optimal use of VLS [LMS] features' (Padayachee et al., 2015:7). Academic staff development and support seem to be an essential aspect in the EdTech implementation (Kyalo & Nzuki, 2014). As a result, there is a crucial need that the selected EdTechs are supported as to what value they add for teaching and learning. In addition, academics often want to engage more on the usefulness of EdTech tools and how the tools is used to support student learning. Therefore, in selecting, designing and developing EdTechs, it is advised that the design aligns to the context of each institution and academic level of use (Padayachee et al., 2015).

While it is acknowledged that there is no single 'best' framework, or 'best' learning theory (Mayes & de Freitas, 2011) or 'best' EdTech model supporting the use of EdTechs for teaching and learning, it is necessary for academic staff to receive some guidance in their selection and use of EdTechs. A wide range of models and frameworks for the development and implementation of EdTech have emerged in the literature to this end. In this section, I provide a brief introduction to some models used.

2.7.1 R2D2 Model

The Read, Reflect, Display, and Do (R2D2) model was designed for reflecting on and organising of online activities, which takes students' experiences of technology and their literacy practices into account. The framework calls for careful use of educationally appropriate online resources that are available to promote student learning. These are mostly Web.2 tools that allow students to engage critically with each other. The model, according to Bonk and Zhang (2008), intends to address issues of student diversity and unequal access. This model is designed to cater for students who come from diverse backgrounds and with different learning experiences. The combination of methods to learning may enable students to find ways to their own learning.

2.7.2 First principles in the use of EdTechs

The United States Agency for International Development (USAID) produced a compendium with broad guidelines for the implementation of EdTechs in various sectors. This collection highlights the first principles in designing effective education programs using information and communication technology and the implementation and use of technology programs in education. These 'First Principles' aim at assisting those working with educational technology to support the introduction of technology for education or to enhance their previously designed/implemented EdTech practices and projects. Since the implementation of EdTechs differs across contexts, it is advised that these principles be adapted according to the needs of different users in different situations. According to USAID, the issues and methods for supporting education are based on a broad understanding of current approaches to EdTechs. The ten principles draw on literature for the key considerations and achievements in using technology for teaching and learning. The 'First Principles' on designing effective education programs in using ICT are seen as relevant guidelines in all technology implementation. The ten principles include:

1. Use ICT to achieve education and development goals.
2. Use ICT to enhance student knowledge and skills.
3. Use ICT to support data-driven decision making.
4. Include all short- and longer-term costs in budget planning.
5. Explore technology alternatives to find appropriate solutions.
6. Focus on teacher development, training, and ongoing support.
7. Explore and coordinate involvement of many different stakeholders.
8. Develop a supportive policy environment.
9. Integrate monitoring and evaluation into project planning.
10. Use capacity to build capacity as system strengthening precedes system transformation.

In planning my study (and reflecting on what these First Principles meant for my own work), I have developed a graphical representation of the institutional stages that would need to be considered in applying the First Principles for the South African context.

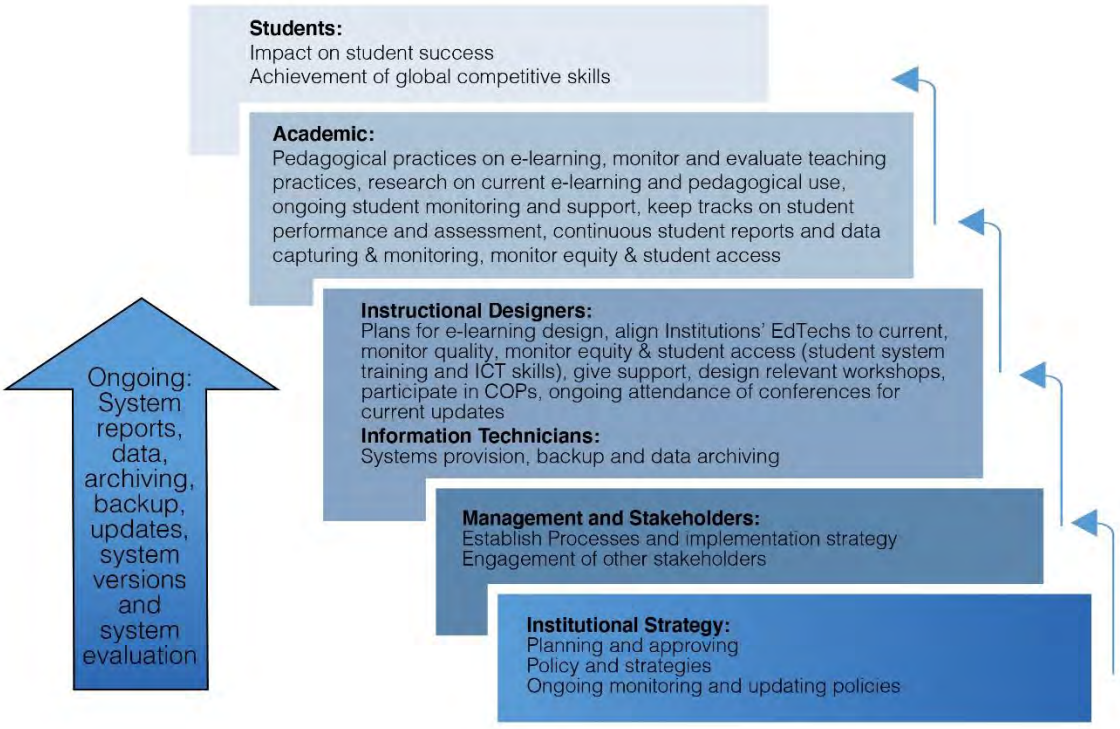

Figure 1: Graphical representation of the suggested strategy for implementing Educational Technologies in an institution

These models all suggest an extensive set of considerations in using technology for education, beyond technical proficiency. They also suggest the need for a number of stakeholders to be involved, beyond the lecturer and student. In particular, there is much literature to suggest that the nature of EdTech requires specialised knowledge that is unlikely to be found in either the IT department or in every academic, because what is being implemented is at the intersection of IT and education (Mistri, 2017). This intersection is often referred to in the literature as 'instructional design' or EdTech, more broadly.

2.7.3 ADDIE model

ADDIE stands for Analysis, Design, Development, Implementation and Evaluation of e-learning developments. ADDIE is a model often used by instructional designers for development of workshops, multimedia and e-learning products. Figure 2.2 is a graphical representation of ADDIE model, depicting how the elements relate to one another when designing e-learning materials. It should be noted that some literature research argues that some elements of design phase should be addressed in the developmental phase or vice versa, nonetheless, it is

clear that the work of EdTech staff can include complex decision-making and support processes.

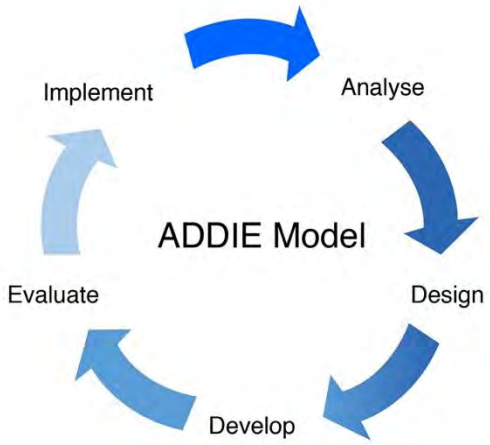

Figure 2: Graphical representation of the ADDIE model

2.7.4 IBSTPI competencies and standards

The International Board of Standards for Training, Performance and Instruction (IBSTPI) has developed a set of competencies and performance statements to outline the complexity of instructional design work (Richey, Fields & Foxon, 2000). According to Richey et al. (2000), there are 23 instructional designer competencies and 122 performance statements. These competencies are clustered into four categories, namely, professional foundation, planning and analysis, design and development, implementation and management. Competencies relate to skills and abilities that an EdTech staff member can be classified as having. Competency standards measure and determine the need for skill development and professional growth in individual performance. The use of these competencies allows an institution to make informed judgements in describing the duties and roles of the instructional designer or other EdTech staff member with an aim of having the best candidates for the job of supporting the academic staff. They also illustrate that this work entails a complex intersection of technical and people skills.

Richey et al. (2000) also suggest that those in EdTech have a role as change agents within an institution. However, instituting and supporting change is not always welcomed by academics (Richey et al., 2000).

There are four roles for EdTech that the IBSTPI identifies. First, the Analyst role specialises on performance analysis and training needs assessment. Second, the Evaluator role entails being responsible for evaluating a variety of e-learning systems, e-learning material and multimedia products, including electronic assessment resources. It entails mostly the quality assurance of e-learning products. Third, the E-learning specialist role focuses on designing and developing web-based multimedia and e-learning materials, mainly online learning resources. The last role is the role of project manager where instructional designers oversee the implementation of EdTech in a variety of projects. Hodgkinson-Williams and Czerniewicz (2007) indicate that these roles are not fully adopted in South African HEIs and that most people in EdTech units are not positioned to take them on. One of the outcomes of this study was gaining insight into this issue.

Beetham, Jones & Gornall (2001) indicate that the responsibilities and focus of EdTech work varies greatly across institutions. Given their locations in the different universities with varying social practices, EdTech staff are pressured in keeping-up with emerging and trending technologies. Keeping an eye to pedagogical tools, which may be productively used in academic situations is vital. The staff working in this fields are most likely to be supporting the main activities of teaching and learning, including assessments.

The duties and functions of EdTech staff, according to Beetham et al. (2001), include:

- Consultation and liaison with academic staff in ensuring that the implementation of EdTechs strategies applies across the university faculties, rather than in one faculty department or specific project.
- Provision of EdTech knowledge and services to academic staff and students in responding to their scholarly requirements and expectations.
- Establishment, development and supporting a culture of evidence, for example, success in learning and impact on teaching practice.

Figure 3 depicts the roles and responsibilities of instructional designer in SA HEI, EdTech support departments. It should be noted that these instructional designers are classified as either supporting staff or academic staff. This implies that in some institutions, instructional

designers have a teaching role and, in some institutions, there is no academic interaction with students.

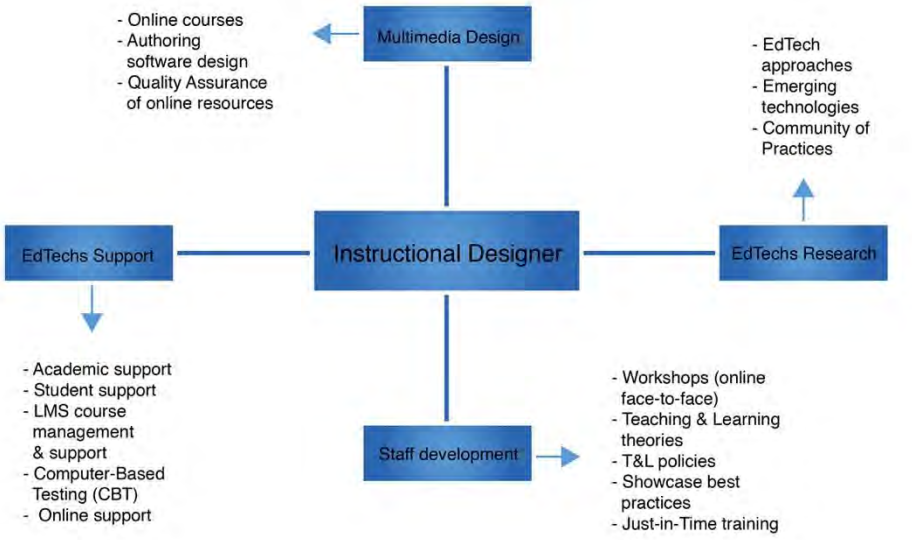

Figure 3: Diagram representing Instructional Designer roles and responsibilities

2.8 Conclusion

ICTs form part of the higher education arena in South Africa and institutions are encouraged to embed pedagogically sound practices when using ICTs for education (Moll et al., 2007). As I have outlined in this chapter, there is a lack of clarity around terminology and around the roles and responsibilities of those working in the field. There are First Principles and a range of other models, standards and competences that specify what is entailed in EdTech work, all of which suggest a complex set of roles and responsibilities.

A brief look at the literature on the use of educational technology in South Africa suggests that its use is highly uneven and to a large extent this replicates the historical disparities from the apartheid era. The literature indicates that there is some form of LMS in every South African university but it seems that there is very uneven levels of support and uptake and often limited understandings of the educational capabilities of an LMS.

In this chapter, I have argued that the use of EdTech has to take epistemological access into account. That is, it needs to be implemented in ways that enhance students' access to knowledge. This entails taking the learning context carefully into account, including the digital

divide and the extent to which students have access to hardware and internet as well as the literacy practices entailed in engaging with online materials.

To answer the research question, 'What enables and constrains the uptake of EdTech?', I needed to have a clear theoretical stance and a workable research design. I discuss each of these in Chapters 3 and 4.

Chapter 3: Theoretical framework

3.1 Introduction

Every piece of research is underpinned by an ontological position. By this I mean that all research has a relationship to truth as it constructs knowledge about that truth. The purpose of this chapter is to make explicit through a theoretical framework, the relationship between knowledge and truth in this study. The intention was to identify a theory that allowed for the description of social interactions, observations and relations to a social phenomenon. Social realism allowed me to identify relationships and thereby to uncover the underlying causes for particular experiences. This chapter explains social realism, the meta-theory that underpins this study. The aim of any research is to generate and contribute to a body of knowledge (Glatthorn, 1998) while being guided by a theoretical framework and principles of conducting research (Denzin & Lincoln, 2002). The aim of this chapter is to outline how I understand my role as a researcher and how I planned, through this study, to contribute to the conversation of the use of EdTechs. Using the theoretical framing that I outline in this chapter, I had the opportunity to identify the participants' experiences and EdTech related events, which enabled me to understand the enabling or constraining mechanisms that conditioned these experiences and events.

In this research, elementary critical realism (CR) was used as an under-labourer to inform my ontological and epistemological understanding of educational technologies in the social world. By under-labourer, I mean a theory that articulates the nature of truth in the study. Various authors (for example, Case, 2013; Boughey & McKenna, 2021) refer to critical realism as an underlabourer, that is a foundational or underpinning theory that helps the researcher grapple with issues of truth and reality. CR provided a structure that supported critical social inquiry; and this framework required that I ask what reality must be like for other things to be (Bhaskar, 1998). In other words, what must South African higher education be like for EdTech uptake to take the form it did? It is through this framework that a clear difference between ontology (being in the world) and epistemology (knowing the world) was made.

Scott (2000:16) suggests that in conducting research that separates ontology and epistemology, researchers should address questions such as, 'What is the nature of the reality which we are attempting to find out about? How can this be known? What are the

implications of the answers to these questions for the choice of methods used?' In using CR as the under-labourer for this research, I needed to overcome the fallacy that reality of the world is simply what is observed and what is known through experiences. Such a positivist account reduces experience to knowledge and knowledge to truth. It assumes that we can always observe the underlying causes that bring about certain events. A critical realist view, on the other hand, proposes that the depth of reality is unpacked, whereby we identify and explain "the conditions under which reality might be changed" (Bhaskar, 2012:54).

3.2 Philosophy of Critical Realism

A meta-theory is associated with the exploration and analysis of what is contained in theory itself. Critical realism (CR) as the underlabourer, the underpinning philosophy, or meta-theory, entails an understanding of reality as structured, differentiated and changing (Bhaskar, 1989). Pioneered by Roy Bhaskar, CR views reality as independent of people knowing about it (Bhaskar, 2008). The truth is not just the observations of reality, it includes what can be observed but there is also much that we are not aware of which still has effects in the world.

Critical realism as an underpinning philosophy maintains that the truth cannot just be observed because much is beyond human empirical experience. Thus, it claims distinctions between the study of knowledge (epistemology) and the study of existence or being (ontology). In this study, the experiences of how EdTechs were understood and implemented by various EdTech staff in the different higher education institutions were collected as data and the mechanisms enabling or constraining the uptake were identified with the understanding that this would offer a rich but partial picture of EdTech uptake.

Gorski (2013:661) describes critical realism as 'a philosophy of science, a theory of what (good) science is and does'. CR understands the world as an 'open system' (Millar, 2014). Open systems are social structures that can transform, adjust and change through various influences, settings and conditions. In much research, there is an attempt to form a close system whereby variables are controlled so that consistent measurements can be taken. Laboratory based research, for example, will attempt to control all variables to be able to measure the effects of any one variable. Bhaskar (2012) argues quite strongly that society and the natural world are open systems, where variables cannot be controlled and, therefore, that understandings of causality will always be partial. Various institutions like universities are classified as open systems because they are social structures that are composed of many

elements that interact and produce certain practices which generate effects and outcomes. Therefore, outcomes in open systems cannot be predetermined and explanations of what mechanisms cause, which events will always be partial and need to be understood to be multiple and intersecting (Boughey, 2013).

The critical realist approach of the world as an open system argues that describing the structures, mechanisms and events assist in understanding reality (Bhaskar, 2008; Danermark, Ekstrom, Jakobsen & Karlsson, 2002; Boughey, 2013). But this requires an understanding that causality is rarely simple and that our knowledge of causality is always limited. However, knowledge, as limited as it may be, can bring change to what the world is or offer insights into what it could be (Bhaskar, 2008; Danermark et al., 2002).

Critical realism understands that reality exists as independent structures that may be triggered by a range of mechanisms including humans. The mechanism of technology, for example, is developed and implemented by people and this has transformative possibilities for higher education around the globe. Critical realism is not only associated with occurring events as establishing reality, but also unexercised causal mechanisms are seen as important features of reality (Lopez & Potter, 2001). In this way, critical realists interpret reality as layered in a depth ontology and comprising the three domains of the real, the actual and the empirical.

3.2.1 Depth ontology of critical realism

The world or reality, according to Bhaskar (2008), consists of three ontological domains, known as the real, the actual and the empirical. The real is whatever exists, be it social or natural (Bhaskar, 2008; Sayer, 2000). The real is the encompassing layer and includes the other two layers. It is said to be relatively intransitive, which means that mechanisms exist whether we know about them or not. The real includes mechanisms in both the natural world and the social world. Bhaskar (2008) claims that what scientists discover in nature is documented in thought and words. Hence names are given to new discoveries and explanations are developed, such as the newly discovered image of the black hole in 2019 by various scientists and astronomers (The Event Horizon Telescope Collaboration, 2019). However, structures and causal laws in nature are not determined by human thought. ‘If there were no science there would still be a nature, and it is this nature which is investigated by science’, argues Bhaskar (2008:17).

Second in this stratified, depth ontology, and incorporated within the real, is the layer of the actual, in which events emerge from the interplay of active mechanisms (Danermark, 2002). These events may be noticed or unnoticed by human beings. These events are caused to happen in the actual layer by the activation and interplay of mechanisms within the real layer. For example, in this study, the real, would include the existence of the internet and all that makes up Information Communication Technologies. The actual, in this study could be seen as events that take place using educational technologies, within teaching and learning situations. These events, for example, could be the activities that students are required to perform.

Lastly, is the empirical layer of the stratified, depth ontology. This empirical layer is a sub-set of the previous layers, and it is in this layer that observations and subjective experiences take place. In the empirical layer, people observe what is happening with their senses and perceptions. The observations and different views of what has occurred are informed by, for example, their social histories and personal approaches. This is why it is that two people can be at the same event (such as an EdTech workshop) and experience it very differently. These observations can be fallible, erroneous and inaccurate owing to the limitations of an individual's various interpretations (Danermark et al. 2002). For example, some academics may experience EdTechs to be a burden while others experience it as an opportunity to be creative in their teaching and learning. Reducing our knowledge of a phenomenon (such as EdTech) to our experiences of it, is being guilty of what Bhaskar (1989) termed the 'epistemic fallacy', in which reality is equated to only our knowledge of the world. The experiences of EdTech staff, collected and analysed in this study, could provide powerful insights into the phenomenon, that is the uptake of educational technology, but it is only part of the explanation.

In taking a critical realist ontological position, this research study attempted to move beyond anecdotal evidence of experiences and events at the empirical and actual levels in the data to identify some of the underlying mechanisms from the level of the real. These are mechanisms with generative powers; thus, their active interplay emerges as events at the level of the actual, and experiences at the level of the empirical. Figure 3.1 illustrates the three layer of critical realism ontology.

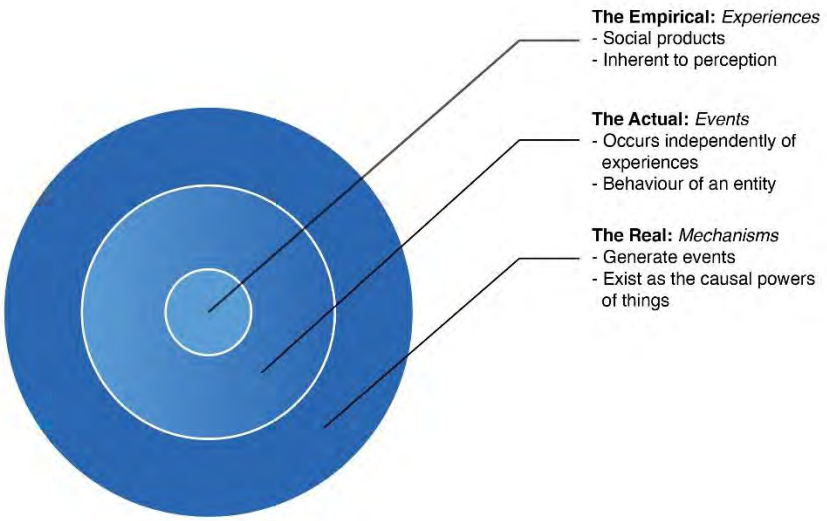

Figure 4: The three layers of CR ontology, adapted from Elder-Vass (2004)

Although mechanisms have causal powers at the level of the real, these powers are not always exercised, and when exercised, they might not always generate events (Collier, 1998). They might intersect with other mechanisms that reduce their effects. For example, a policy might be a powerful mechanism enabling the uptake of educational technology, but if the policy is not read or implemented because of the nature of the institutional culture, then it will not be effective. Collier (1998) further argues that the layered ontology allows researchers to identify and explain actual events by connecting the events to the level of the real. Researchers are then able to identify events in the social context being studied. The world is thus characterised by events and mechanisms that generate and give rise to them (Bhaskar, 2008).

The three realms of reality, according to Bhaskar (2008), are not normally visible in gradual stages but social actions (or interactions) carry them out in gradual stages. In social structures, people enter any social context with already existing experiences, and they bring in knowledge, skills and practices from their previous experiences. These experiences influence the manner in which people interact with the social structures that they encounter. The critical realist approach of the world argues that researchers should clearly describe the structures, mechanisms and events to explain how they came about and act as they do (Danermark et al., 2002).

The critical realist approach is, therefore, characterised by the existence and interplay of a number of mechanisms, which cannot then be controlled as variables, in the way that they might be in laboratory experiments (Boughey, 2013). The realist ontology, thus, offers the possibilities within this open and messy context to 'understand how we could be or become many things which currently we are not' (Sayer, 2000:12).

This ontology allows for new knowledge to be generated through using the critical lenses, allowing for the layers of the social structures to be separately unpacked to identify generative and causal mechanisms of events. Since CR recognises the reality of the world independently of our views and our knowledge of it, a depth ontology allows social researchers to identify, uncover and clarify the existence of the underlying mechanisms that may have causal powers to a given social phenomena.

3.2.2 Emergence of events and mechanisms

Bhaskar defines emergence as 'the relationship between two terms such that one diachronically, or perhaps synchronically, arises out of the other, but is capable of re-acting back on the first and is in any event causally and taxonomically irreducible to it, as society is to nature or mind to matter' (1994: 73). This means that events emerge from each other and, therefore, are likely to influence one another. Danermark et al. (2002) further explain that mechanisms at one level (for example, the actual) are generated by causal powers and mechanisms of the underlying layer (that is, the real) and that these mechanisms then form a new phenomenon with its own distinctive powers, different from the original structures and mechanisms which produced them. The new events that give rise to emergence have 'emergent powers' (Danermark et al., 2002: 60) to influence structures and situations.

On the grounds of the critical realist ontology, the focus of this research was to begin with garnering an understanding of how events had emerged with regard to technology in teaching and learning practices. To determine events, I gathered the experiences of EdTech staff regarding technology uptake. Furthermore, I identified how events had emerged through the uptake of EdTechs. Lastly, I analysed how conditions enabled or constrained the uptake of EdTechs. This last analytical move used a substantive social realist theory, discussed in Section 3.3.2 of this chapter, to identify the underlying mechanisms from which EdTech uptake did or did not emerge.

In this research, all Information Communication Technologies (ICT) including educational technologies could be regarded as mechanisms at the level of real. These ICT (and EdTech) structures have generative mechanisms (causal powers) and tendencies. Looking at examples of generative mechanisms in educational technologies, one could think of the uses of EdTech in learning situations. For example, if a course had as an outcome the promotion of critical thinking skills through communication, then the lecturer might target using a particular EdTech tool, for example, a discussion forum tool, whereby actual communication events in the form of posts and replies by students are generated. These communication messages would be visible in the level of the actual in that they are events that have occurred in the world. Or if there was a learning outcome that stated that the student will be able to work effectively in a team, the lecturer might develop an activity where students work in teams. In these examples, the existence of learning outcomes may have acted as mechanisms driving the use of EdTechs, however, a number of mechanisms such as the lecturer's fear or admiration of technology or the availability of bandwidth or any number of other mechanisms may mean that the same learning events do not emerge in the same way even where the specified outcomes of the course might be the same.

The exploration in this study was to identify the events and practices which happened at different higher education institutions regarding the use of educational technologies and then to go beyond this to identify some of the mechanisms that enabled or constrained EdTech to be taken up in the ways that it had been. While CR demanded that I moved beyond describing the events and experiences evidenced in my data to identifying the mechanisms from which they emerged, it was the social realist theory with its analytical dualism that provided my substantive theory and analytical framework by which to do this.

3.3 Social realism as substantive theory

Margaret Archer's social realism (SR) was the substantive theory I drew on in this study and is consistent with the philosophical starting point (Ritchie & Lewis, 2003) outlined. Archer (1995) builds on Bhaskar's critical realist ideologies with special focus on the social context (Danermark et al.., 2002). Archer (1995) introduced a framework of social reality as containing three social domains, namely, structure, culture and agency. These domains underpin the

social realist philosophy and are at play at all layers of the CR depth ontology introduced in Section 3.2.1. Structure, culture and agency comprise of mechanisms, as they each have emergent powers, and when these are activated, they can emerge as events and can be experienced in various ways. At the layer of the real, structure, culture and agency act as mechanisms with emergent properties; at the layer of the actual, structure, culture and agency manifest as events; and at the level of the empirical, structure, culture and agency are experienced in multiple ways. Social realism postulates that things happen because of the interplay between structures, cultures and agents.

3.3.1 Structure, culture and agency

Structures comprise various organisational parts of the social world. A structure can be defined as a set of inner related entities that have their own powers, mechanisms and emergent abilities (Danermark et al., 2002). Structures can be regarded as institutions such as the university or national governing bodies. Structure can also refer to concepts such as social status, education, gender categories, racial classification, marriage, and others (Boughey, 2013). These are entities that pre-exist individuals, that is, each of us is born into and grows up in a society that already has such structures. Furthermore, structures are seen as resources, social positions, institutional and national bodies (Archer, 1995; 2000). Structures are regarded as entities that influence the way people behave and functions in a social context. In this study, for example, the concept of 'structure' relates to institutional resources, Information Technology (IT) infrastructure (hardware), educational technology systems (software) and EdTech units, for example. All of these structures shape how institutions operate. This study, therefore, identified and investigated structures that enabled or constrained educational technology uptake.

In relation to culture, Archer (1995) talks about how things are done in an institution. Cultures are principles, values, norms, ideas and beliefs of a particular organisation. Culture, similar to structure, has emergent powers that remain dormant (inactive) until they are triggered by human interaction (Archer, 1995; Danermark et al., 2002). Examples of culture in this study could be values and beliefs attached to educational technologies and discourses of what constitutes pedagogical ways of using EdTechs in teaching and learning contexts. for example. Culture offers ways in which values and beliefs manifest in practices. Therefore, culture is the

ways of doing things in an institution based on belief about what is or is not valuable or appropriate.

Lastly, on agency, Archer (2003) speaks of the activity of people (actors or agents) in existing structural and cultural entities. People have the power to exercise agency in social contexts (Archer, 2003). Structure and culture are enduring and can only be activated by agents who are limited to individual life (Archer, 2003). Agents generally in this study related to the EdTech staff members who provided the data, supported the use of EdTech and conducted workshops for academics and other such events. Agents might also include other stakeholders, for example, academics, students, IT personnel and institutional management.

Agency can be classified as primary or corporate (Archer, 2000). This categorisation relates to degrees of power possessed. Archer (1995) describes primary agents as a people who are at the same level in terms of contextual activities and levels of power and influence. Primary agents are highly conditioned by societal norms and values because there are limited agential powers available to them. Students may be only able to access primary agency in some contexts where they have little power over the curriculum, for example. Academics might only be able to access primary agency where they work in very hierarchical universities and they enjoy little autonomy, for example. In the situation of EdTech uptake, the individual academics may not have sufficient institutional authority to demand support for EdTech use but working collectively, they might find that their agency is sufficient to bring about change, this is known as corporate agency.

Corporate agency is when groups are formed by members who have the same interests in an institution. For example, the 'UP2U' forum is a forum of instructional designers who meet biannually to share expertise on the EdTech support for academics. During a social interaction between primary and corporate agency, individual actors can transform the extent of their power.

Alongside primary and corporate agency, Archers (year?) also identifies social actors who are people who have power because of the social roles they inhabit in society. For example, the vice-chancellor of the university has more potential power to influence the uptake of educational technology than an individual academic or student. Though different individuals

might enact the role of vice-chancellor in very different ways, they would all have significant agency because of the role they hold.

As an overview of the discussion of social realism thus far, Figure 3.2 depicts a few examples of structural, cultural and agential conditions relevant to this research study.

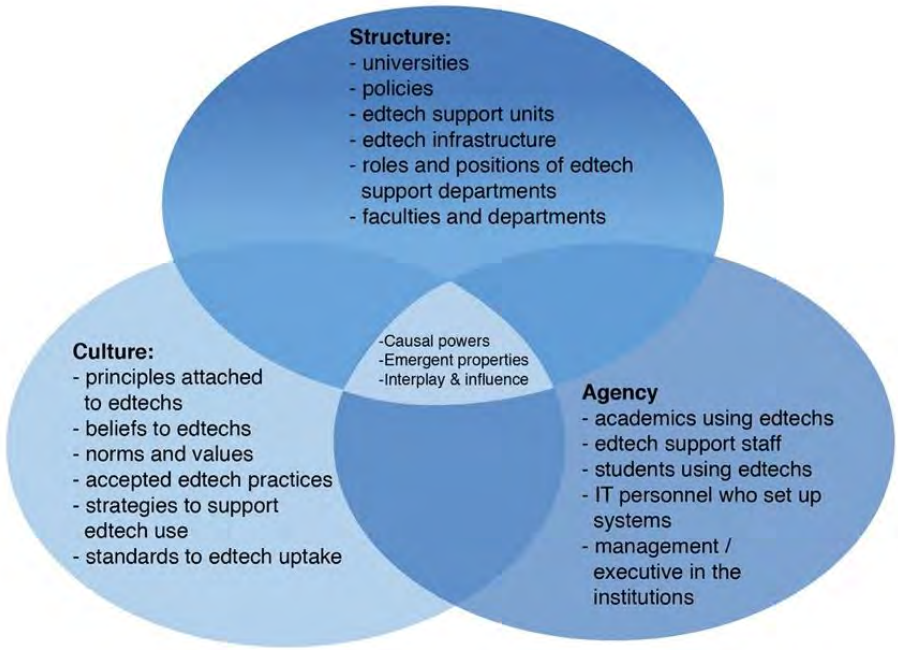

Figure 5: Archer's (1995) People and Parts

The figure above further identifies, in the intersecting middle, the common elements that each domain possesses during interplay. During interaction, emerging properties of structure, culture and agency are generated to produce events that either enable or constrain agential action. During this interplay, mechanisms generate causal powers, which are experienced in multiple ways. Archer (1995) sees structure, culture and agency as interactive and each domain holding its own causal powers and unique emergent properties. The emergent properties of each of the realms of structure, culture and agency are relational, which means they can interact and condition each other (Archer, 1995).

Understanding the world as a layered reality brings about possibilities to look across institutions to identify how mechanisms have influenced the uptake of educational technologies to enhance and support teaching and learning. Understanding that multiple mechanisms work together for any social phenomenon to happen opened a way for me as a

researcher to look critically at the uptake of educational technologies, the impact they make on teaching and learning practices as well as the constraints and enablements in the use of EdTechs.

3.3.2 Analytical dualism

While the emergent properties of structure, culture and agency are interrelated, Archer (2003) draws an ontological difference between the two domains, namely, *parts* and *people* of society. The '*parts'* comprise structure and culture, whereas the '*people'* entails the agency of individuals. The people and the parts are closely intertwined, making it hard for researchers to isolate them (Archer, 2003). To identify the causal powers of generative mechanisms in the social context, social realism claims that structure, culture and agency should be understood to work together but need to be analysed separately to discover the interaction between their powers and properties (Archer, 2003; Boughey, 2012).

In using a critical and social realist approach, the aim is to identify the role that people and the parts play in relation to the given phenomenon, in this case, the uptake of educational technology. This process of separating the people from the parts to identify the role played by each is referred to as analytical dualism. Archer (2003) introduces the framework of analytical dualism for the purpose of separating the interplay so that the powers of each can be understood. Without analytical dualism, it is difficult to bring about change as the causal tendencies of each is not visible.

Archer (2003) argues against the conflation of the *parts* and *people*. Conflating the parts and the people may give rise to misjudgements, misconceptions and doubt. According to Archer (2003: 17):

> … conflation occurs when the *parts* or the *people* are deprived of their emergent, autonomous and causally efficacious properties and powers, and that in consequence their interplay is denied, conflation (and its directionality) might be considered an unwarranted source of confusion.

One form of conflation is when all causal efficacy is attributed to the structures at play as if people are merely robots at the whim of structures. People may then be denied exercising their freedom and agency. This is termed downwards conflation. On the other hand, upwards

conflation is just as problematic as this is where the researcher assumes that all events and experiences emerge in totality from the actions and intentions of agents as if they are entirely free and are in no way constrained by the structures and cultures of their context. Certain structures in the social context may condition people to act in certain ways, and not being aware of this can prevent a full understanding of the phenomenon. It is for these reasons that structures and agents should be taken apart during data analysis. In this study, if analytical dualism was not used, then it would be possible to analyse the data purely in terms of the roles played by EdTech staff, students and academics without acknowledging the larger structural and cultural context in which they work (upwards conflation) or to suggest that the uptake of EdTechs emerges entirely from larger structural and cultural contexts and cannot be changed by the actions of individuals (downwards conflation). I endeavoured in this study to look for the causal tendencies of structure *and* culture *and* agency in the EdTech staff's experiences in the data. The domains should be viewed and analysed separately, as each contains its own different properties and causal powers, although, in this exploration, the interplay of each with the other was identified. Archer (2010) further maintains that structural conditions are internalised procedures and that individuals have the autonomy to act in their own way, at any given period.

There is also a third form of conflation identified by Archer (2000), which she terms 'central conflation'. Archer (2000) suggests that this is a very common problem in much social science research. While central conflation acknowledges the powers of both actors and structures, it explains events according to inseparable combination of structural, cultural and agential mechanisms. The 'people and the parts' are held in a 'conceptual vice' whereby it cannot be established what role was played by each of the identified structural, cultural and agential mechanisms. Being unable to account for the powers of each makes it difficult to bring about change because it is not clear what the causal tendencies of each has been. As a result, the effects of each need to be unravelled to identify the possibilities for change.

Archer (2003:17) maintains that 'any form of conflation has the same consequences. Hence, conflation is the more generic error and reductionism is merely a form of it, or rather two particular cases of it'. The complex interplay between structure, culture and agency results in the emergence in certain situations of change or continuation without change, which Archer (1995) describes as morphogenesis and morphostasis.

3.3.3 Morphogenesis and Morphostasis

In social systems, agents enter into already existing structural and cultural contexts, and are required to change, adapt and adjust to these existing environments. They may find that the pre-existing environment offers enablements to their actions as they make their way in the world. On the other hand, the environment in which they find themselves may have constraints that challenge their ability to achieve their personal projects. Most likely, there will always be both, some mechanisms may enable and others may constrain. Agential actions may react to either accept or challenge and change these structures and cultures (Sayer, 2000). The agents can again be transformed through the social context, the same as they are able to contest and change the structures through their actions (Sayer, 2000). These transitions in social contexts (Archer, 1995) are mostly reliant on realist understanding of emergence. As noted in Section 3.2.2, emergence is how things happen or come about through the interplay of mechanisms (Elder-Vass, 2012). Therefore, social events are shaped by emergent properties and the interaction of structural, cultural and personal entities (Elder-Vass, 2012). Each of these domains has its own underlying and causal powers and different emergent properties, which are interactive with each other (Archer, 1995), which is why analytical dualism is necessary.

EdTech staff, who were the participants in this study, could thus be thought of as agents who entered pre-existing structures and cultures, and were required to adapt and adjust to such environments. This adaptation might have caused some constraints or might have enabled their actions. The cultural and structural contexts might be changed or maintained over time and space depending on the nature of the interaction of the agents within those contexts. For example, the merger of higher education institutions as cultural and structural context happened after the post-apartheid era (over a period of time and space), which led to the differentiated institutions. These transitions are known as the 'morphogenetic' approach (Archer, 1995) where society is continually changing through the actions of agents, albeit enabled or constrained by the structural and cultural contexts. In the South African context, the government initiated changes and transformation from the previous racial division of higher education institutions to the new dispensation of differentiated institutions that combined all races across the country.

On the other hand, Archer (1995) speaks of the *morphostasis*, which refers to unchanging environments. Such environments, for this study, could be, for example, where academic development workshops on EdTechs were offered to academics, however, the impact was invisible, as there was no change in terms of the uptake of EdTechs for teaching and learning. Morphostasis could also occur where academics could not see how EdTechs might empower them to improve their teaching practices.

Morphogenesis explains how agency shapes society and is also shaped by society, through examining the interplay of the distinctive features of (personal, structural and cultural) emergent properties (Elder-Vass, 2012). This research study examined the effects of emergence through identifying the various elements that interacted to produce emergent properties. The uptake of educational technologies might be dependent upon the availability of various structures, the culture of the particular institution and the agents involved within such social structures.

The study explored the relationship between structure, culture and agency that each higher education institution had in terms of educational technologies. It further identified the existence, implementation and uptake of educational technologies for teaching and learning. As a result, the Morphogenesis and Morphostasis approach (MM approach) assists researchers to identify how transformation or lack of change happen over a time (T_1-T_4) period. The MM approach is sequential and takes place in three revolving phases, namely:

- T_1: Structural-Cultural-Social conditioning
- T_2-T_3: Social or Cultural interaction
- T_4: Structural-Cultural-Social elaboration (genesis or stasis)

For the purpose of this study, the MM approach was not strictly applied, that is, the phenomena being studied was not observed over a time period. However, the study focused on the holistic generative and causal mechanisms that enabled or constrained the uptake of EdTechs in HEIs. The three aspects of social realism (structure, culture and agency) were studied as separate entities. Thus, analytical dualism was the analysis framework that was applied. In studying these phases separately, the issue was to identify generative and underlying mechanisms of how structural and cultural situations enabled and constrained the actions of agents, that is, academics, in this study.

The analysis thus led me to postulate on 'What the world [of educational technology use in higher education] must be like?' (Bhaskar, 2008:47). The study sought to determine 'what must the society be like…' (Bhaskar, 2008:47) [for agency in the uptake of educational technologies?]. Bhaskar formulates the question thus, 'What must the world be like for science to be possible? What must society be like for science to be possible?' (Bhaskar, 2008:47). Furthermore, I drew on the *critique of technological determinism* by Howcroft and Trauth (2005), arguing against the view that educational technology can be a remedy for teaching and learning problems, for example, student failure rate. The technological determinism states that multimedia and technology describe how people behave (think, feel and act) as technology emerges and is implemented (Griffin, 2000).

Critical realists oppose deterministic perceptions of the world, arguing that mechanisms have tendencies at the level of the real to use causal powers. Therefore, there cannot be predictions (Boughey, 2012) during the interaction that produces events at the level of actual and experience at the level of empirical. While the focus of this study has distinguished the structural, cultural and agential conditions of enablements or constraints to the uptake of educational technologies, these conditions were identified based on experiences of participants. The aim was to identify and uncover generative mechanisms and not predict the effects of those mechanisms.

3.3.4 Situational logics

The social realist theory of social change (Archer, 1995, 1996, 2000) provides researchers with an analytical framework that allows for the identification and explanation of events within structure and culture that give rise to social phenomena. Building from critical realism, which regards society as open systems, social realism holds the same views of society as open and having different layers. Archer (1995) recognises structure, culture and agency to be analytically different and separated. These social entities are observed as relatively enduring and having causal powers that are neither visible nor reducible to social relations (Archer, 1995; Luckett, 2012).

During social interaction, both structure and agency are transformed. It is during this transformation that situational logics are experienced and identified, as to how and why

human actors responded to a situation and what events and situation transpired after the socio-structural interaction.

Situational logic consists of 'analysing the situation of the acting person' (Popper, 1992:79). It is a form of identifying how individuals react to a given situation. Situational logics acknowledge that the world has people living in it and people have own perceptions of the world. It identifies how people act in a physical world and recognises that reality has structures and resources that can become hindrances to some individuals. As agents act and react differently to structures with which they are confronted and faced. Thus, situational logics is able to identify the action by individuals. Situational logics recognises the structure and culture in which agents act by forming relations, which could either hinder or assist each other's operations. This framework informs human agents in understanding the current situation to expand and improve practices (Luckett, 2012).

The purpose of the situational analysis was to use 'theoretical interpretations of current social dynamics' (Archer, 2014:59) to identify the different cultural, structural, social practices which emerged from the engagement with data. This enabled me to identify mechanisms at play together with relations that gave rise to situations. In her 'Late Modernity' book, Archer (2014) suggested a method to be followed in analysing situations and giving a tentative finding. Firstly, she highlighted the importance of 'identifying generative mechanisms' which lead to 'tracing emergent phenomena to such mechanisms' followed by 'establishing their complex mutual connections and drawing a synthetic picture, which finally leads us to conclude whether a new type of society is being born or not' (Archer, 2014:52). Identifying the mechanisms at play and linking the agential action, result in the ability to determine whether change has occurred.

As Archer (2014) points out, that instead of generalising from a single or more characteristics of a social event, which often does not explain in totality the emerged events, social researchers have to prepare themselves to dig deeper in identifying the mechanisms at play. The generative mechanisms identified will then allow for the establishment of internal relations with specific institutional patterns and their related situational analysis (Archer, 2014). These identified situations and tendencies are likely to bring about different outcomes (Archer, 2014). To reiterate, this research, therefore, aimed to uncover the underlying mechanisms that enabled or constrained the uptake of educational technologies.

As situational logics recognises structural, cultural and agential relations, these relationships can be deemed complementary or contradictory. Complementary relations are those relations that give rise to a situation whereby agency is aligned to the processes of social structures. Complementary relationships occur when operations enable each other to function with harmony. Whereas in contradictory relations, the processes hinder certain operations, such that agents are challenged. Contradictions and complementarities may lead particular situational logics. During contradictory relations, there is some discord between mechanisms. Whereas in a complementary relations, mechanisms are aligned and reinforce each other. These relations are either necessary to each other (meaning where the one occurs, the other must too) or contingent (meaning that both are there but do not necessarily talk to each other and one is not necessary for the other to occur).

	Contradictions		**Complementarities**	
	Necessary	**Contingent**	**Necessary**	**Contingent**
Situational Logic	correction	elimination	protection	opportunism

Table 1: Situational logics, adapted from Luckett (2012:341)

The table above is the summary as adapted from Archer's (1995) structural and cultural situational logics, which result from the different relationships during morphogenesis and morphostasis. For the purpose of this research, I used only the adaptation from Luckett (2012) to identify the relations during the uptake of EdTechs in the different institutions, and not the more complex set of situational logics illustrated in the table below.

Table 1. Summary of cultural and structural morphogenesis/morphostasis at system and social levels (adapted from Archer, 1995, p. 303).

	Contradictions		Complementarities	
	Necessary	Contingent	Necessary	Contingent
Situational logic	Correction	Elimination	Protection	Opportunism
CEPS: Cultural system	Syncretism	Pluralism	Systematisation	Specialisation
Socio-cultural interaction	Unification	Cleavage	Reproduction	Sectionalism
SEPs: Structural system	Compromise	Competition	Integration	Differentiation
Social interaction	Containment	Polarisation	Solidarity	Diversification

Trajectory of morphogenesis shown in the meta-analysis of the ADP review

Table 2: Morphogenesis / morphostasis at systems and social levels (adopted from Archer, 1995:303)

The above two tables show the different relationships, or 'situational logics', that may be experienced by actors in a social system. A variety of situations, tensions and uncertainty is visible at various levels during social interaction with structures. Using Luckett's (2012) simplified version, where two mechanisms can be identified that are necessary to each other but contradictory, there will be a situational logic of correction, where something will be amended or adapted to allow the mechanisms to continue to exert their conditioning power. Where the two mechanisms are contradictory, but just happen to both be active in the same context (contingent), there will be a situational logic of elimination, where something will be got rid of to allow the mechanisms to continue to exert their conditioning power. Where the two mechanisms are complementary, that is they enable each other, they will lead to protection of the status quo if they are in a necessary relationship and will provide the possibilities of opportunism where they are contingent. In all these cases, the situational logic is not deterministic, these logics are what is likely to happen. But because mechanisms exert their power in an open system where multiple mechanisms will always be at play, we cannot say with a large degree of certainty that these relationships will always lead to the situational logic playing out as expected.

The use of this framework was to develop an understanding of how structure, culture, and agential relationship influenced the uptake of these educational technologies. Archer's analytical dualism framework (2003) to separate the parts (norms, values and resources of the institution) and agency (activities of individuals) was followed. Such an analysis allowed for the identification of the parts and the people, which enabled or constrained agential choices.

3.4 Conclusion

CR, thus, has epistemic relativism, meaning that it acknowledges fallibility of what can be known and ontological realism, that is, acknowledgement of a real world of intransitive mechanisms with real effects, whether they are known about or not. In this chapter, Roy Bhaskar's (2008) philosophy of critical realism as an under-labourer for this study was introduced, that is, as the foundational and underlying conceptual theory. I explained in brief the three ontological layers and how reality informs what knowledge and what truth are.

Using critical realism as an under-labouring philosophy for this study enabled the use of an exploratory methodology that differentiated between the layers of the real, the actual and the empirical. CR research aims to identify mechanisms that possess causal powers which emerge as events that can enable or constrain the social context. The use of CR, therefore, afforded the possibility to identify deeper explanations of the phenomenon of the uptake of educational technologies.

Additionally, CR placed on me the responsibility to identify causal powers for phenomena and to move beyond the empirical observations. Identifying mechanisms that enabled or constrained was not a straightforward process as it required deeper digging during data analysis to identify some of the generative mechanisms that produced particular events and situations.

To this under-labouring theory of critical realism, I then introduced the substantive theory of social realism. Social realism understands social phenomenon as comprising structure, culture and agency, and as emerging from the interplay of mechanisms (or 'emergent properties'). The features of emergence were applied for analytical purposes with reference to the emergent properties of structure, culture and agency. These emergent properties were identified and how change was experienced as a result of interaction of structure, culture and agency, through a process of analytical dualism.

The important element of the study was to use this analytical dualism to identify and understand the interplay between the mechanisms of structure, culture and agency to identify the generative and underlying mechanisms that enabled and constrained the uptake of EdTechs for teaching and learning in differentiated institutions.

In using SR, I indicated the need to identify the relationship between structures, cultures and agency within the different institutions in terms of educational technologies. The three aspects of social realism (structure, culture and agency) were identified in the emergence of the data, which was the experiences of EdTech staff. While all events and experiences emerged through the interplay of these three mechanisms, they conditioned the powers of each other. In studying them separately, I focused on identifying how the structural and cultural situations enabled and constrained agency. This study, thus, considered the experiences of EdTech staff and the events they described and then, using analytical dualism,

attempted to establish how such experiences and events emerged as they did. Making sense of the enabling and constraining effects on the uptake of EdTech in the domains of structure culture and agency thus became the study goal. In Chapter 4, the process followed to achieve this goal is explained.

CHAPTER 4: Research Methodology

4.1 Introduction

Chapter 4 describes the planning and conceptualisation of this study, together with the research questions and aims. This chapter also describes the methodology applied with regard to the research design as well as its alignment to the under-labouring framework. I use the critical realist approach to describe the ontology of events that the nature of reality holds in the field of educational technologies. The discovery and nature of events was conducted through qualitative research approaches (Creswell, 2008), which enabled me to gain knowledge of the community and contexts that I researched. Academic literature was used as a stance to provide validity and as reference to claims and arguments from this study. Through this chapter, I explain how data gathered aligned to the chosen frameworks of critical and social realism. Methodology entails the methods used in the research design, but it is more than this as includes the paradigm or ontological position of the study. Chapter 3 outlined the CR and SR position and, in this chapter, I discuss the actual steps that were followed to enact this realist position.

4.2 Locating the study within qualitative research approach

The whole study employs a qualitative approach. Denzin and Lincoln (2000:1) define the history of qualitative research as 'long, distinguished and sometimes anguished'. In outlining the qualitative research history, these authors highlight that this research approach originates from anthropology and sociology. Qualitative research was later adopted in other disciplines such as business and education to understand and make sense of their practices (Janesick, 2000). The second edition of Denzin and Lincoln's Handbook of Qualitative Research (2000), gives an interesting explanation for qualitative research, this definition is adopted throughout the study, which is stated as:

> Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic

> approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 2000:3).

This defines what qualitative research is and highlights the purpose of such research. However, given the realist position that was taken in this study, the aim was not to end with 'the meanings people bring' to the phenomenon. Instead, I tried to identify the underlying mechanisms from which such meanings emerged. Thus, this research project was set around a layered ontology of understanding mechanisms as working in an interplay to emerge as events and experiences.

Qualitative research is a complete approach that includes an outcome and discovery of something (Williams, 2007). It is defined as a model that happens in a natural location. According to Creswell (1994), it allows the researcher to expand research details by developing various levels through connecting the actual individual experiences. Qualitative research is mostly identified through the social phenomenon being studied, which is described through the respondent's perspective.

Qualitative research can be referred to as a method to examine, an approach that strives to understand a particular phenomenon in its natural state. This is done by using descriptive text and words to explain the phenomenon. In this study, the context on educational technology uptake, provides an opportunity to investigate practices by interrogating structures and cultures from the human understanding and experiences through digging deeper to the values, beliefs and attitudes that advance certain practices of teaching and learning. The use of qualitative research seemed an appropriate research method as it allows for the deeper exploration of such complex issues (Creswell, 2007).

The research method is an approach to the investigation, which according to Myers (2009), changes from the basic assumptions to research design and information generation. This large-scale study took place across the public South African higher education system. The nature of such an open system means there are no unique connections between variables (Bhaskar, 1989). Consequently, this may reveal meaningful results on how the conditions relate to a phenomenon being explored across contexts. This meant that while I identified mechanisms at play in enabling or constraining the uptake of EdTechs, this did not mean that

the particular mechanism would be at play in every university in the study or that it would have the same effects wherever it was at play.

It is important to maintain consistency between underpinning philosophy and the research method (Snape & Spencer, 2003), in this case, critical realism and the social realist approach. Qualitative research is able to include a variety of data collection methods, for example, interviews, open-ended questionnaires and document analysis, which are essential to understand the participants' thoughts, views and actions in a particular context. Using a variety of data collection instruments afforded opportunities to collect multiple experiences of EdTech staff. Using analytical dualism, I then had to identify the mechanisms that conditioned the uptake of educational technology.

Research design is understood as the step-by-step research plan that gives direction as to how the project is to be conducted. It clearly illustrates how all the main fragments of the research project are to be carried out, for example, samples and data instruments. The design shows how these parts work together to try to address the research question and the aims of the study. Research design can be seen as an action plan where processes that optimise the validity of data are realised. It is important for such a design to be aligned to the ontological position, as outlined in previous chapter.

The intent of this study was to understand and identify the conditions that enabled or constrained the uptake of educational technologies at 26 higher education institutions. The inclusion of multiple sites was because there is a dearth of such studies in the South African education (Deacon et al., 2009). CHE (2014) have also indicated a need for a better understanding on the current nature of EdTech use across the higher education sector in South Africa. However, there was an awareness that, with the broader scope, there was a need to reduce depth.

The researcher approaches a research context with a particular background and knowledge about the phenomenon being studied. Researchers are located in the world with a set of ideas and an ontological stance that categorises a set of questions (epistemology), which are then studied using a specified methodology and analysed following a guideline or specific principles (Denzin & Lincoln, 2002). Data is collected as empirical evidence guided by research questions and aims. This data is then analysed and findings are written up for intended readers.

According to Denzin and Lincoln (2002:33), 'all qualitative researchers are philosophers' because they are guided by a theoretical framework and principles of conducting research. These sets of ideas speak to beliefs about the nature of reality, the kind of being (*ontology*) and the connection between the researcher and what is known (*epistemology*) and ways of obtaining knowledge (*methodology*). These views outline how a qualitative researcher understands and performs in the world. The researcher is restricted around the ontological and epistemological principles, which in the words of Bateson (1972: 314) are 'regardless of ultimate truth or falsity become partially self-validating'.

4.4 Data collection

Educational technology is a complex phenomenon and its uptake in the teaching and learning fields is the research interest of this study. EdTech staff in the South African higher education were the key unit of analysis in the social research; key units referring to things or people being studied and analysed (Long, 2004). It was difficult to establish how many EdTech staff there were in the system and thus what the potential study population was. The number of EdTech staff per institution included two to 15 people who supported academics in the use of EdTechs. In some cases, there was one EdTech staff member per faculty, in others just two staff members served the entire university, and in others there were no staff members whose full-time work pertained to the support of educational technology.

As is discussed in Section 4.10, obtaining ethical clearance and permission to conduct the study in each university was a time-consuming challenge. In the end, EdTech staff from 22 universities completed the survey and interviews were conducted with EdTech staff from 19 universities.

The recruitment of participants was negotiated at the 26 universities (through the e-learning directors, managers or heads of the department). The targeted participants from these institutions were the e-learning support staff. The participants included anyone responsible for offering e-learning workshops, staff development courses, ICT short courses and generally supporting academics in using educational technologies for teaching and learning.

My own work within such a unit meant I had developed a good relationship with many of the participants and I anticipated being able to include a broad spread of institutions, in terms of both type and history. I had formed relationships with some participants in our community of practices (CoP) of instructional designers (UP2U). This CoP is conducted twice a year and rotates among participating institutions. All institutions are invited to the meetings, however, not all attend these biannual CoPs. Despite these connections, I still encountered challenges in conducting research in institutions where contact information was not available in the public domain. Information about the departments or e-learning units was obtained mostly through my own connections or searching in institutions' websites. Where the head of department or director of EdTech had their contact details listed on the website, I sent them an email request. In some cases, the vision and goals of the EdTech departments were clearly stated on their website. Working through the websites was thus worthwhile as an exercise to learn how these units conceptualised themselves and promoted the services they rendered. Some of the publications, research activities, Open Educational Resources, Massive Open Online Courses, and conference proceedings were also available on their websites. I thus gained some insight into what some of the units were doing as well as a sense of the general uptake of educational technology within these institutions. But in other cases, website searches revealed nothing about educational technology in that university.

In most universities, responses from the unit directors seemed highly supportive of the study. These authorities motivated participation, which was evident with permission being granted and the institutions stating that they encouraged participation in the study. I received, from some institutions, a response email from directors acknowledging the importance of the study and that request was forwarded to relevant participants. However, this support could not guarantee high response rate from the EdTech staff.

In other cases, it was evident that EdTech staff did not receive the invitation to participate in the study owing to non-participation from a particular institution. They either did not see the request, forgot about the request because of the busy nature of their work or used their autonomy not to participate. There were some cases where respondents had to verify with me if they could resume the survey at a later stage as they wanted to verify information from their institutions' (or EdTech) policies.

4.4.1 Online survey

After obtaining ethical clearance from each university (see Appendices A and G), the first phase of the data collection was the dissemination of an online survey or questionnaire (see Appendices C and D), which was administered through Qualtrics Survey Software. This online survey was used to collect both quantitative and qualitative information from the support staff within the EdTech Units about the use of EdTechs. The quantitative data was recorded to collect information on the number of participants who took part in the survey, access to various EdTechs resources, what learning management systems (or forms of EdTechs) were used and the roles of EdTech staff in each institution. The qualitative data included reflections and understandings of what enabled and constrained knowledge and skills in using EdTechs and experiences on the use of e-learning workshops and staff development courses to support academic staff in EdTech implementation.

The survey was selected as a technique to allow participants to give honest views, experiences and opinions with an assurance that their inputs were secured and anonymous. This type of online survey allowed respondents to take time in responding and respondents had an option of resuming the survey at another day or time because the survey was structured in such a way that it captured and saved the responses and participants continued where they left off the survey attempt.

The survey questionnaire had five sections. The first section dealt with biographical information and the other three sections dealt with questions about e-learning / EdTech support staff roles and experience, EdTech infrastructure, strategic goals that supported the use of EdTechs and EdTech constraints. The last section was contact information for the participants who were willing to participate in interviews (Refer to Appendix E). This questionnaire contained 25 questions, a combination of 11 close-ended and 14 open-ended questions. The questionnaire was distributed to all 26 institutions through an email request from the director of the e-learning units. There were 69 entries in the survey, upon exporting and downloading the survey data. I then inspected each entry for validity. Only 56 surveys were included in the study as the remaining had either no or extremely little data. These were probably from either the ethical clearance committee of each university checking the link or the directors of the EdTech units checking the survey before sending the invitation to their staff.

In some institutions, the survey was posted on the campus-wide, online news bulletin, in some, the Human Resource departments handled the deployment of the survey and, in other universities, the email was sent directly to the unit director. In cases where Human Resource department distributed the survey link, an accompanying form from that institution was completed, whereby I had stated the targeted participants. I would discover that indeed the intended group was reached by their participation in the survey.

It was noticed that the survey responses came both from EdTech staff and teaching staff. Where respondents were teaching staff members, data obtained from the qualitative information, seemed to be a result of the survey being posted on the university-wide platform, the intranet or from academics who held dual roles (academic support and teaching staff).

Despite the limitations throughout the process of data collection, the online survey provided a unique opportunity for collecting data through the e-learning units. The online survey was particularly useful for the research design and as an effective participant recruitment method for this study. This was because the survey was available through an electronic link, the survey could be taken using mobile devices and the system had capabilities to allow respondents to exit and resume the survey later if there was some interference, if they needed to consult for information or clarity as well as for referral to policies and strategies of e-learning. As indicated, it was not clear what the potential population for this survey was as there was little clarity as to how many EdTech staff there were in the SAHE system, so it was a challenge to calculate the response rate. Furthermore, in some universities, EdTech staff wore multiple hats as they also provided IT end-user support or they were academic development practitioners where supporting EdTech was only part of their job. The 56 respondents to the survey nonetheless probably constituted about 40% of EdTech staff. Importantly, the responses reflected the entire spectrum of institutional type and history. Figure 6 illustrates the participation from the different HE institutions.

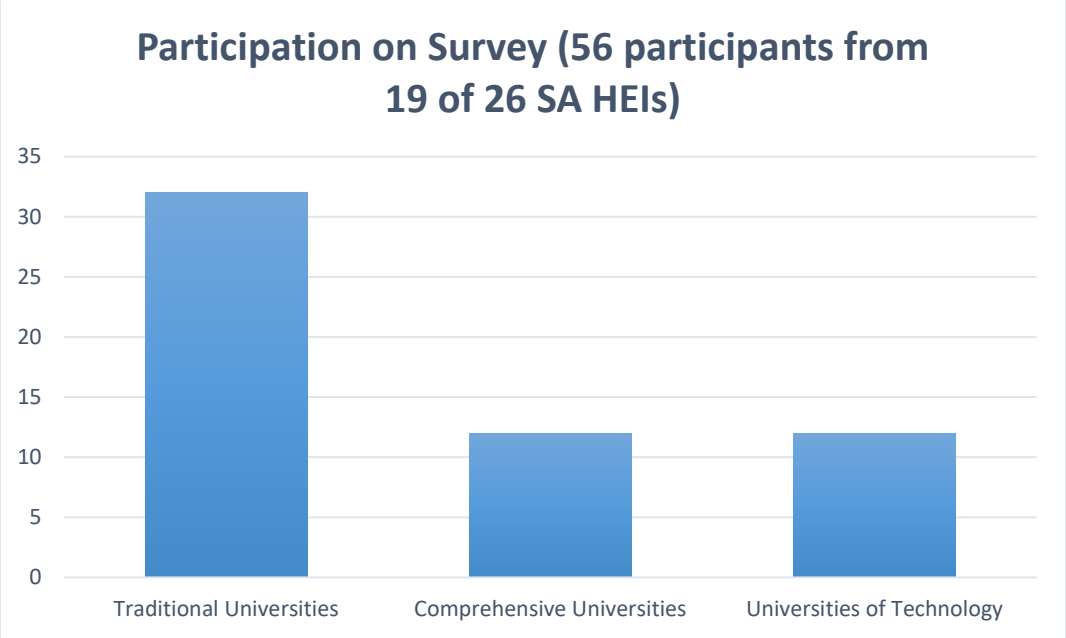

Figure 6: Participation in survey by institutional type

4.4.2 Interviews

The most popular advantage of an interview is its ability to obtain detailed information through a direct contact with the respondents (Genise, 2002; Shneiderman & Plaisant, 2005). While the same set of guiding questions was used, I was able to ask follow-up questions and probe deeper into certain responses.

This data collection process was conducted through semi-structured interviews among EdTech staff who indicated on the survey that they would be willing to be interviewed. The purpose was to understand the use of EdTechs and to explore in greater detail their views, experiences and practices. Interviews were used owing to their comprehensive way of allowing the respondents to fully express their views. The use of interviews is driven by the fact that it allows for follow-up questions and probing to clarify concepts that might be unclear from the responses. Follow-up questions were asked in circumstances where respondents needed to elaborate on their answers, which resulted in more in-depth data being gathered about their responses (or comments). As a key feature of interviews is the depth of focus (Lewis et al., 2003), the interviews provided opportunities for detailed exploration of each person's perspective and experience.

The interviews in this study, lasted 45 minutes on average. A sound recording device (Amolto call Recorder for Skype and iPhone voice memos application) was used to assist me in

capturing and transcribing accurate information. This was given consent to by all participants. Thirty respondents indicated on the survey that they were willing to participate in the interview but in the end only 24 interviews were conducted as it proved difficult to find suitable times for the other eight (see Appendices B, E and F). Eight of the 24 interviews were conducted in person, two were conducted via telephone owing to connectivity problems with Skype and the rest of the interviews were conducted through Skype calls since respondents were in various provinces of the country.

The interviews began by establishing informed consent. Questions that were asked included the EdTech staff's understanding of conditions that influenced the uptake of EdTechs (such as infrastructure, connectivity, motivation, competence by students and academics, and other related factors), as well as how e-learning support units overcame negative factors and encouraged positive factors. These questions formed part of a larger scope of the open-ended questionnaires and the semi-structured interviews. The interview question schedule is available as Appendix G, though this served as a guide only and various follow-up questions were included according to what arose in the interview process.

Participants were put at ease through extending a warm greeting, explaining and reading out study title, taking into consideration that some participants might have completed the survey a while back and might have forgotten the study's title. Throughout the interviews, I listened carefully with courtesy, making notes where a follow-up question had to be made. The follow-up questions arose not to express opinions on the issues highlighted but were rather to gain clarity on an opinion that the participant had expressed. This practice was also used to ensure empathetic listening (Maxwell, 2005). Using empathetic listening (Maxwell, 2005), qualitative researchers arrange a series of 'interconnected interpretive practices, hoping always to get a better understanding of the subject matter at hand' (Denzin & Lincoln, 2003: 13). From the amount of time it took for the completion of some interviews, the information obtained and experiences expressed about the uptake of EdTechs by some interviewees, gave some indication that some participants were at ease in sharing their knowledge.

One of the questions in the survey referred to policies, guidelines…a number of participants also raised this matter during the interviews. While documents were not part of the data collection, they formed an important part of the study. Documents are seen as a way of giving

instructions, responsibilities or agreements, however, documents are also seen as actors (Prior, 2003). These documents as structures, control, guide, influence and shape the interactions of agents (Prior, 2003; Archer, 1995). Other EdTechs related documents, for example, annual EdTech unit reports were also considered.

4.5 Data transcription

Data was analysed by making use of an external transcriber owing to the massive volume of data that was collected from the institutions. The transcriber was given a letter of confidentiality to sign (see Appendix H) whereby issues of not discussing data with anyone else were highlighted.

When there were unclear words from the interview recordings, the transcriber left gaps and indicated with notes that sound was indistinct. I then ensured that I listened carefully to the recording to fill in the gaps. I made sure that all data recordings were listened to for validation before sending to respondents for member checking. An email was sent to each participant requesting their validation. Each participant was given four weeks to respond to their transcripts and it was noted that if there were no response, it would be taken that the transcription was accepted. Some respondents were given their transcriptions through the use of Google Docs and a unique uniform resource locator (URL) was sent to participants to comment on the documents.

4.6 Data analysis

It is noted that research subjects would rarely give full details in explaining about the object of study. 'All they can offer are accounts, or stories, about what they did and why' (Denzin & Lincoln, 2000:31). Consequently, there is no particular method that can hold all of the understated variations in continuous people experiences. Therefore, qualitative researchers make use of a wide range of interrelated explanatory methods, in pursuit of seeking different and better means to understand the worlds of experience and contexts they are investigating.

Since qualitative research is interpretive and endless, the researcher constructs and interprets the empirical data in her/his possession. But this does not mean that any interpretation is

equally valid. There are processes involved in interpreting this field text. For the data analysis, I first used what Chen and Maton (2013) call soft-eye analysis to obtain a general sense of what was in the data.

As argued earlier, there are endless processes to interpret and present the researched findings. This is often done through a set of guidelines and principles that are guided by a structured theoretical framework within a field. I explained in Chapter 3, Section 3.3.2, Archer's (1995) analytical dualism framework as a realist approach, which allows researchers to understand how various social contexts are structured in terms of the interactions and practices. As a result, analytical dualism enables researchers in social fields to analyse their ways of practice by offering guiding principles on how practices are categorised as having different properties that enabled or constrained the uptake of EdTechs. This framework, therefore, provided me with a useful analytical lens to make sense of how educational technologies were being used and on what basis this use occurred. However, since the study took place in multiple contexts, this required different phases of data analysis.

Phase one was data from the open-ended questionnaire and phase two was comprised of the interviews. The two phases merged the two separate continua of analytical dualism. The interviews conducted with the EdTech staff where participants' views were analysed on how they described situations that enabled or constrained their understandings and their beliefs about the use of EdTechs. The analysis of this data informed phase three, which was comprised of the EdTech policies. Data collected in the form of the EdTech policy documents formed phase three of data analysis. As in the other phases, I used analytical dualism, analysing data within each of the institutional EdTech policy/guidelines and then analysing this in the light of the institutional context.

Each phase informed the focus of the following phase. Analytical dualism directed the analysis to identify relations on institutional understandings, beliefs, norms and values about the use of EdTechs. The analysis identified differing take ups of EdTech as well as the enablements and constraints conditioning this.

Given the nature of this study and the use of critical realism as the underlabouring theory, the results of this research needed to be triangulated as a means of collecting multiple experiences and reports of events. Triangulation typically relates to verifying data by collecting it from multiple sources, but as I was working in an open system (Bhaskar, 2008), triangulation was used not for verification but rather to ensure that as full as possible a picture of the events and experiences was developed through the data collection. Critical realism acknowledges the varied ways in which events can occur. For the study data, which was collected from various contexts, that is, different institutional types with different histories, was triangulated through multiple data sources, namely, survey, interviews, and documents, as participants had varied experiences and reported on a range of events.

In addition to manual coding, I used word clouds, which were automatically built by the Qualtrics software to be an add-on research tool to upkeep traditional text analysis methods (McNaught & Lam, 2010). These word clouds represented the different words (codes) within the collected data text. The more the word appeared, the more significant the concept is (McNaught & Lam, 2010). The word cloud had no intrinsic meaning but helped me to visualise what was most important to my participants and this formed part of my soft eyes analysis. As these word clouds dealt with each word as the unit of analysis, I used them as a way of validating my initial understandings of the data (see Figure 4.2)

Figure 7: Example of Word cloud as soft-eyes data analysis

The analysis of data was dealt with in two phases. The first phase in analysing data was to organise data into key issues or organisational themes. The second phase was to identify and understand the structural mechanisms at the level of the real, which manifested in the actual and empirical layers of the data. Thus, I had to consider each issue or theme that emerged in the data and to ask what structural, cultural or agential mechanisms were in play for the data to emerge in the form that it did.

4.7 Data reporting

The participants' identities were anonymised throughout this thesis. In the three findings chapters that follow, as per ethical clearance agreement, data quotes are not ascribed to any specific institution or person within that institution. All results were treated with respect, and care as well as consideration were also taken to avoid any harm to the participants or the reputation of the institutions. The main reporting in the data analysis chapters was not on an individual participant or even institution but rather to create an understanding of the spread

of the data across the sector. This was performed by developing a table framework to move from the data to an external language of description (Bernstein, 2000) whereby the 'themes' in the data that emerged through 'soft eye analysis' (Chen & Maton, 2013) were coded using analytical dualism. This analysis process allowed me to begin to see how mechanisms such as the infrastructure had a bearing on the extent to which educational technology was used. During data analysis, the referencing system was developed by coding survey questionnaire responses with question numbers, for example, SR58 indicated that it is the Survey from the Respondent number 58, then Q24 meant it is question number 24 in the survey. Furthermore, the interview responses, was coded as IR for Interview Respondent, number 14, meaning 14th respondent in the interview schedule.

4.8 Positionality

Denzin and Lincoln (1994) maintain that it is essential to consider the researcher's personal attitudes, beliefs and association to the object being studied, as this may have a bearing on the method chosen, for example, the researcher's ontological position. The researcher interacts with the collected data and has powers in the data generated, therefore, 'it is important that the researcher reflects on his or her position, including the values, assumptions, and theoretical views that he or she brings to the study. Such reflexivity adds depth and rigor to the research undertaken by clearly exposing the influences that have shaped the design and framing of the research' (Given, 2008: 193).

The researcher's task is to make sense of the data through various interpretations including inductive interpretation. In any given situation, there are multiple realities through which the researcher and respondents build their own understanding to a subject matter. Archer (1996) argues that individuals have pre-existing conditions that determine how they view and re-act to the world. In attempting to move from the experiences and events shared by EdTech staff in the data to identifying the mechanisms that enabled or constrained them, I had to be aware of my own agency. My own understanding of EdTech and my experiences at the University of Pretoria where I worked could greatly affect my ability to identify mechanisms.

In using qualitative research, researchers are always cautioned against subjectivity (Lincoln & Guba, 1985). But in critical realist research, this is particularly the case and analytical dualism

assists in this regard as researchers need to constantly question the role of structure, culture and agency in the emergence of the events and experiences captured in the data. It is imperative to form trust with participants, however, this might take time but it is worthwhile, as participants are inclined to be honest and describe in detail their experiences (Lincoln & Guba, 1985).

In addition, there were seminars and research spaces that I attended to keep track of what was trending and emerging in the field of EdTechs. This turned out to be spaces where relationships were developed with some of the institution's instructional designers. The most popular biennial e-learning event is the Community of Practice (CoP) for instructional designers (known as UP2U). CoP is considered very important for EdTech staff as it takes a form of a mini-conference, where papers focussing on e-learning tools are presented. Another event was organised as a colloquium in the Birchwood conference centre, East Rand in 2014, by the Council on Higher Education, as a space to formulate the policy on EdTechs in higher education. The outcome of the colloquium was to facilitate the EdTech policy that informed ICT use in universities. The first Legitimation Code Theory colloquium was also hosted by the Cape Peninsula University of Technology in 2015 where I presented on some pilot data obtained from my institution about use of EdTechs. This colloquium gave space for me to explore on what was valued by academics in using EdTechs for knowledge, skills and practices. In attending these seminars, conferences and CoPs, relationships with role players in field of EdTechs were formed. This again provided me with opportunities to expand my knowledge in the field and to introduce my study to some of the audiences at the conferences. Engaging in these gatherings, offered me ways of enhancing my knowledge and becoming better acquainted with the e-learning environment.

For institutions that took part in UP2U, participation in my study was approved without delay but at universities where there was no participation in CoP, it was somewhat difficult to get access. In some institutions, one representative from the unit was selected to give a holistic response of how the EdTech unit operated and how academics were taking up the use of EdTechs, whereas at others, anyone who wanted to voluntarily participate in the study was encouraged to do so.

I think my location and position as a member in the field of EdTech accelerated participation in many institutions. Participants seemed happy to share experiences, constraining or enabling, with someone working in the same area. I believe that my participants felt secure and protected owing to our shared status and even enjoyed the interview process. There was little evidence of power imbalance and a general sense of conversation about common experiences. As an EdTech staff member for the past nine years and having obtained my master's degree in computer-based education, I was arguably seen by the participants as an insider.

4.9 Ethical considerations

Permission to conduct research at the 26 SAHE institutions was obtained by approaching the ethical clearance committees to obtain internal ethical clearance from each institution (see Appendix G). Upon obtaining ethical clearance from the different institutions, participants (EdTech staff) were contacted through the unit director (via email) with a request to participate in this study, clarifying the rationale and ethical permission of this study. The details of the invitation letter included their voluntary involvement and how data collected from them would be handled. All participants who indicated a willingness to be interviewed were issued with a consent form, which informed them of their rights in participating in the study or withdrawing from the research study (Webster, Lewis & Brown, 2014). This consent form included the permission to record and store their responses using various technology devices. My duty as a researcher was being responsible for the data collected and storage of this information according to each institution's ethical clearance regulations. This was a very lengthy process with each institution having different requirements. It was anticipated that the Rhodes University clearance was sufficient in the lodging of this PhD study (see Appendix A), but the ethical clearance process was different across institutions which took more than a year to obtain from all the different institutions (see Appendix G).

A number of ethical considerations informed my data collection process. These considerations include:

Respect and dignity

Participants throughout this study were respected and treated with dignity. The purpose and full details relating to this study were communicated with all universities prior to any data collection process. All ethical clearance certificates obtained from the universities were available per request from the researcher. The privacy and confidentiality of participants was ensured throughout the data reporting.

Transparency and honesty

The online survey was created specifically to maintain anonymity of the participants, therefore, the online questionnaires were completed anonymously. All information concerning personal identities of respondents collected from the study was treated as anonymous. Results of the research was further reported to in a combined format to protect the identity of the individual participants and institutions. All results were stored according to Rhodes University's policy after completion of the research. Informed consent was issued to participants prior to data capturing and the rights of individuals to refuse to participate or withdraw from participation was communicated and respected (see Appendix B).

Accountability and responsibility

Access to data collected from each institution and participant was only shared with the transcriber and the study supervisors. The informed consent form was signed by the transcriber before availing each recorded audio for transcription. The informed consent form is attached as Appendix B in this thesis. It was my responsibility as a researcher to obtain all internal ethical clearance, for all institutions (EdTech units) which required such. Participants were given an opportunity to proofread their transcripts. Any direct quotations used in the chapter maintained the correct referencing practice.

Integrity and academic professionalism

Integrity and academic professionalism were maintained through anonymous and unbiased reporting. Any publications that arise from this study will not contain an institution or participant's identity.

4.10 Data collection limitations

There were some challenges experienced in reaching the targeted participants for the completion of an online survey. The first major difficulties and limitations in obtaining data

from the different institutions was the issue of obtaining ethical clearance. In collecting data for this study, I was faced with the difficulties of reaching the targeted respondents. Though the channels to reaching the participants was followed through obtaining various permissions, however, my observations from the qualitative data sets, depicted that not all respondents received the survey link. In most cases, the receipt of email requesting participation was acknowledged by the EdTech directors and HODs. A reply email that they forwarded the request to participants was received as I would be copied in the email. Some directors of the units would grant permission that I could follow-up should a need arise. It is important to improve ways of making contact with potential participants, to confirm the value of their participation, explain issues and give guidance where applicable. Some participants would respond and inform me that they had completed the survey and upon checking, I would discover that they had also accepted the interview invitation.

This illustrated how different institutions supported research projects and provide access to researchers. In most universities, as the researcher, I was not known to respondents, yet in some I was well-known (through the CoP of instructional designers).

Some respondents experienced technical challenges. The reasons included the institutions having barred the Skype functionality. There were also issues with connecting to Skype using their institutions domain, and some of the respondents preferred connecting to Skype at home. These challenges were technical in nature and mostly were regarding the network connection, server domain and proxy settings of various institutions in using the Skype platform. Only two interviews were moved or postponed owing to this connection problem, however participants were willing to reschedule these interviews. In another two cases, we simply switched to a telephone call to continue with the interview. These issues arose from the network or server connection as opposed to respondents' lack of knowledge and ability to use the interviewing technology.

4.11 Conclusion

In this chapter, I have highlighted the methodology that was used to collect and analyse data. The chapter also explains the composition of the participant sample, how entry to the intake units was negotiated and how specific participants were approached. By collecting data in the form of survey responses and interviews and institutional documentation, I was able to collect

a wealth of insights about EdTech use across the South African higher education system. In applying analytical dualism, I endeavoured to answer the research question regarding the enabling and constraining conditions of EdTech uptake. By moving from the experiences and events reported in the data to identifying the mechanisms that enabled and constrained them, I have been able, in the findings chapters that follow in Chapter 5, 6 and 7, to indicate the context of EdTech use prior to the COVID-19 pandemic.

Chapter 5: The structure and staffing of EdTech

5.1 Introduction

EdTech staff support academics across the university with both online teaching and general use of technology for educational purposes, as was discussed in Chapter 2. In Chapter 5, I consider where the EdTech staff were placed in South African universities. As is discussed in this chapter, in the data, it emerged that the structure of EdTech units varied extensively, as did their job descriptions, the qualifications they were required to have, and their appointment positions and conditions. In this chapter, I plot out where EdTech was positioned in the universities, who EdTech staff were, and what they were expected to do. I argue that these differences emerged at least in part from different understandings of the use of technology in education. In Chapter 8 of the thesis, I draw on the data to argue that these differences had implications for the use of educational technology during the COVID-19 pandemic.

The EdTech structures and units varied across the 26 South African universities. For example, in some universities, the EdTech units were centralised, in others there was a unit per faculty, and in a few institutions, there were no designated EdTech staff at all. In some EdTech units, staff were allocated to provide support to a particular discipline, subject area or field, whereas in others, the support was allocated according to availability with EdTech staff working across disciplinary areas. Some institutions not only had a central unit but also had additional EdTech personnel in each department who worked with academics in the discipline but also drew on the expertise of the centralised unit as a whole (IR006).

From most of the participant responses, though not all, there was evidence of the availability of some kind of training and support for academics in using educational technologies, usually in the form of academic development workshops and, in some cases, through certified short courses and even postgraduate programmes on the use of EdTech (IR003). While some institutions had broad-based forums and online resources for the development of expertise for online materials development and facilitation (IR003), in many, this asynchronous, online support was augmented by face-to-face support, both structured and ad hoc.

5.2 EdTech staff roles and responsibilities

The activities undertaken by EdTech staff varied considerably across the sector. In most cases, EdTech staff supported academics to use technology in their courses, for example:

> To install, troubleshoot and maintain the technology equipment for e-learning (SR33Q5).
>
> To support, facilitation, design and development of blended teaching and learning programmes (SR1Q5).
>
> To manage the Learning Designers, Graphic and Multimedia Designers at the institution. To lead the Blackboard Staff Training Project (SR74Q5).
>
> To provide end-user support and problem-solving on e-learning systems (SR20Q7).
>
> To incorporate e-tools and emerging technologies into teaching and learning. To present presentations, training sessions to academics and students (SR2Q5).
>
> To provide a whole range of staff development strategies, including events, seminars, show-and-tells, resources, position papers, webinars, mini-conferences, one-on-one (SR35Q21).
>
> To provide training and capacity building to individuals, groups, departments and faculties (SR70Q16).

Figure 5.1 illustrates the word cloud of responses on EdTech activities provided.

Figure 8: Word cloud of responses regarding EdTech staff activities

A key responsibility of EdTech staff was to support the use of the LMS, or Learning Management System. Most of the 24 interviewed participants, indicated that they had an LMS, which allowed for the hosting of course materials and class conversations online. Two participants were unsure if there was a university-wide LMS. In one historically black university (HBU), a participant indicated:

> Yes, we have two [EdTech staff members], if you could find one of them… But the process of moving towards the LMS is there. Things are moving but not as fast as they should be, it's moving (IR017).

There was frequent mention of the uneven use of the LMS, though notable differences in that well-resourced universities indicated that most or all departments (if not all courses and modules) had a presence on the LMS, whereas in historically black universities, the use of the LMS was 'minimal' or 'only by a few'.

From the survey participants, Table 5.1 indicates the most used LMSs by the different South African HEIs. Fifty-five of the 56 survey respondents answered this question.

#	Answer	%	Count
1	Blackboard	52.73%	29
2	Moodle	23.64%	13
3	Sakai	20.00%	11
4	WebCT	0.00%	0
5	Angel	0.00%	0
6	Canvas	0.00%	0
7	Home-grown LMS	0.00%	0
8	eFront	0.00%	0
9	Oracle iLearning	0.00%	0
10	Other, please specify	3.64%	2
	Total	100%	55

Table 3: LMS use across the system

Upon identifying the other LMS used, from the survey response table above, only one participant indicated "Moodle from 2011, an in-house version before that" (SRQ10), this was added as a quantitative question.

Fifty-one of the 56 survey respondents answered the question relating to how long the LMS had been in use in the institution. It is notable that in 12 institutions the LMS had been in use for less than five years (see Table 5.2).

#	Answer	%	Count
1	More than 20 years	0.00%	0
2	15- 20 years	9.80%	5
3	10-15 years	35.29%	18
4	5-10 years	31.37%	16
5	Less than 5 years	23.53%	12
	Total	100%	51

Table 4: Number of years of LMS use

EdTech work was largely framed in the data as being support. This was, support for the use of the LMS but also often support of educational technology more broadly. In some cases, this support was framed very explicitly as being focused on teaching and learning (using technology) and not just on end-user support for educational technology (an issue, I discuss in Section 5.9). The participants described their main or core EdTech support as:

> Integrating educational technology and innovative curriculum design/delivery initiatives in teaching and learning (SR17Q5).
>
> Supporting academics with the effective use of technologies for teaching and learning. (SR23Q5).
>
> Collaborating with academics in designing and developing learning solutions (SR58Q5).
>
> Assisting academics with the design and development of their modules and to ensure that it is pedagogically sound (SR59Q5).
>
> Helping lecturers to take this technology and integrate that in the content … we have workshops where we help them [academics] to integrate this using certain pedagogical methods (IR010).
>
> Supporting the academics with the effective use of technologies and supporting them with their module development. This is where I would bring in the curriculum alignment (IR005).

The extent of focus on pedagogical issues alongside technical concerns varied considerably across the data and emerged repeatedly as a key finding as is shown throughout this chapter.

In a few cases, the EdTech staff also worked at a strategic level in supporting institution and faculty-level decision-making regarding the implementation of educational technology:

> Managing a team working with different aspects of learning technologies. Writing the faculty strategy and managing projects (SR8Q5).
>
> Providing leadership at an institutional level on effective integration of ICTs in curricula … develop institutional guidelines and/or policy in relation to ICTs in teaching and learning; manage and offer leadership to other educational technology staff (SR20Q5).

The variations between the activities that EdTech staff were expected or able to engage in emerged at least in part from the very different positioning of EdTech staff within the institution, an issue which I discuss in Section 5.3n, starting with data indicating cases where there was an absence of an EdTech unit or designated EdTech staff.

5.3 No EdTech unit

A few participants mentioned they had no designated EdTech unit in their institutions. Two of the universities that did not participate in this study communicated by email that their universities had not yet established EdTech units. These were the two newly established universities. Participants from two universities in this study also indicated that they did not have a specified EdTech unit but relied on support from their IT division:

> We don't have a unit … We have a team of four from ICT Services and Academic Development who each wear a variety of hats e.g. programmer, web developer, trainer, researcher, strategic planner, instructional designer, educational technology specialist, consultant and systems engineer … We have been trying to establish a unit for many years but were not successful as yet (IR021).

> Capacity issues like the lack of a[n] e-learning / BL [Blended Learning] centre/unit (SR70Q18).

> Before I came here, I was affiliated with a number of South African universities. At the one, we had a very good centre and we worked as a unit to provide a number of services, support and training to the institution… [But here I have to] play a number of roles e.g. to contribute to the strategic focus of the university, do research in the field, prepare blended learning strategic and action plans, participate in blended learning research projects and initiatives. I play a role on the institutional level, faculty level and individual level training and support are important to sustain initiatives such as a blended learning approach. So it's a variety of roles that I play there (IR022)

> Each of the three educational technologists at the university are required to serve the educational technology related needs of two faculties. This is a severe limitation (SR39Q18).

It emerged that in a few cases one, those responsible for the support of educational technology were located within the institution's Information technology department, which was mainly responsible for all hardware and software maintenance and support. Thus, those institutions without an EdTech unit seemed to have one or two people within their IT department who endeavoured to support academics in their use of educational technology, though in such cases, the support was mostly with the technical aspects of EdTech programs (IR020, SR7Q16).

As I illustrate in this chapter, this positioning of EdTech and the kinds of activities EdTech staff were expected to engage in seems to have emerged at least partly from a particular understanding of EdTech in the domain of culture. If educational technology was understood mainly as the application of technology, the support for academics in this regard could be placed within the IT department, whereas if EdTech was understood from a pedagogical position as a means of enabling teaching and learning, the institution was more likely to have dedicated EdTech staff (either in a stand-alone unit or as part of a larger academic development unit).

Unwin et al. (2010) recommend the establishment of EdTech units in South Africa to offer ICT support services across the institution. These units, Unwin et al. (2010) argued, should be run by skilled EdTech staff that will offer support in both technical and pedagogical knowledge practices. The EdTech support staff is often seen at a forefront, advising and supporting academics on emerging technologies. Since the role of EdTech staff is serving the university faculties as a whole, there is a great need for institutions to invest in such EdTech supporting structures (Shurville et al., 2009).

5.4 Placement of EdTech units

With the exception of the four or five institutions, most institutions had dedicated EdTech staff, which were typically either part of the academic development centres focused on staff and curriculum development more broadly (SR20Q8) or were stand-alone centres focused specifically on EdTech (IR004, IR017, IR021). It was evident across the data that it was a structural enablement for the uptake of educational technology to have EdTech units, either stand-alone or as clearly defined sub-sections of the academic development centres. Clearly

designated EdTech staff had various strategies to enable them to support the uptake of EdTech and, in many cases, seemed to enjoy, in the domain of culture, some degree of institutional recognition and influence, for their work:

> The core units that involve themselves in EdTech are [both the] ICT and [EdTech centre]. These units operate with a degree of autonomy from central management (SR37Q12).

> Training and capacity building to individuals, groups, departments and faculties... Support via Centre for Teaching and Learning (SR70Q16).

There seemed to have been various divisions of labour within the EdTech units, either by allocation to specific academic departments and faculties or according to various roles assigned to specific individuals. Such specialised EdTech roles included investigating relevant LMSs, researching emerging technologies and providing training on specific discipline focused tools. These tools/softwares were rigorously tested, piloted and integrated into the official institutions' online environment after succeeding an evaluation phase managed by the EdTech unit (SR3Q12):

> Providing training on the LMS (and related apps) and consulting regarding … e-assessments/etivities[7]/content production and projects (SR69Q5).

There were numerous benefits of having EdTech staff working as a team in a central unit as they were able to share knowledge and experiences and support each other (IR008, IR011, IR015). The well-established EdTech units, which were noted in many of the institutions that participated in this study, emerged as a significant support mechanism for the uptake of educational technology. It was clear from the data that many academics who had integrated educational technology in their practice enjoyed very strong relationships with their institutional EdTech structures and staff. In institutions where such units did not exist, where they lacked capacity, or where they lacked institutional credibility, there was far less evidence of uptake. As a result, the:

[7] etivities refers to 'electronic activities'

> … level of uptake with regard to digital technologies has been affected by the lack of adequate human resources to maintain the level of interest in digital technologies in a pedagogically significant manner (SR39Q25).

Studies have reported that the unsuccessful use of EdTechs might be due to insufficient support from those in the EdTech field (Padayachee, et al. 2015, Unwin et al., 2010). These authors report that a shortage in academic development support for EdTechs and the lack of speedy technical assistance prevented academics in progressing with the EdTech use. Richey et al. (2000) argue that the uptake of EdTech also requires expertise in managing of EdTechs.

Most staff in EdTech units conducted workshops on the pedagogical use of EdTechs, and supported academics with the use of not only the LMS but also other educational technology applications, and, in some cases, they designed and developed multimedia and mobile applications (mobile apps) for educational use (IR006). While they inevitably also addressed general technical requests and problems, this was generally understood to be at the level of trouble-shooting for the application of the software or tools for educational purposes, and not as their central role. In such cases, there was often close collaboration between staff in IT and staff undertaking EdTech support:

> We have a team of four from ICT Services and Academic Development who each wear a variety of hats (IR021)

Though there were a number of different "sites" in which EdTech units were positioned, most commonly, EdTech staff were part of the academic development centres, while in others, EdTech was a separate support unit.

It was interesting to note that in a few cases, those who worked on EdTech issues within academic development centres sometimes also undertook other academic development activities unrelated to educational technology:

> The induction of newly appointed academics, the evaluation of teaching and courses, programme reviews (SR56Q5).

There was generally support for having EdTech as part of a larger academic development centre as both were concerned with quality in teaching and learning and with staff development:

> And the advantage of that – I mean in our case the technology [EdTech] is part of [our academic development] centre. I think that's really important. I don't think the educational technology should sit in another place. So, if we make that a sort of criteria of an appointment … I think it benefits teaching and learning (IR024).
>
> … working closely with staff developers so that they effectively model this use [of educational technology] in our staff development courses (SR19Q23).

In an institution where EdTech units were separate, one participant commented:

> We are different units [academic development and EdTech]. The problem is we are not working across each other. We are doing our own thing and they are doing their own thing. What I see to the best for my institution is that [academic developers] must influence how academics [use] technologies for teaching and learning (IR019).

The only disadvantage noted in the data of being part of a larger academic development centre was the extent to which there was commitment within the broader academic development unit to using technology for education (IR024). While the data evidenced this as the only disadvantage to EdTech forming part of the academic development centre, it should be noted that 'all approaches seem to have their challenges' (IR004).

Being well resourced and centrally located, as part of academic development or as a standalone unit, emerged as a key enabler to the uptake of EdTech. It also allowed EdTech staff to have a community to deliberate on educational technology issues and to strategise on the best response to problems as they arose. Such institutional level EdTech communities, even where they consisted of only two or three people, was a significant enabler. There was also mention of the importance of EdTech communities beyond the institution such as the COP, UP2U.

Wenger, McDermott and Snyder (2002:4) define a COP as, 'groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis'. In COPs, members see value and benefit from each other. Thus, seen as 'knowledge building' by Wenger (2011:1) among experts in that field. The COP environment allows sharing of resources so that members do not re-invent the wheel in dealing with some of the common ID challenges in various

situations. They share experiences and good practices, including ways of dealing with repetitive and day-to-day challenges (Wenger, 2015). EdTech research and publications are quickly distributed within these COPs and members share knowledge relating to the current state of EdTechs.

Within the SA HEIs, the COP forum was created for sharing instructional designing practices. The COP was initially started by three universities, and its original name, 'ItsUP2JU', was an acronym derived from the three institution's names. It was later joined by other institutions and the acronym changed to 'UP2U'. There are currently biannual meetings held on rotational basis among represented institutions. A representation across institutions in this COP seems vital as members value the opportunities to share discourses in various ID topics. At the UP2U seminars, there were various research presentations, which highlighted successes and challenges to EdTechs. The trending ICT topics were discussed and good educational technology research and practices were presented using a conference approach.

Although there were cases, which were context and discipline-based, members had an opportunity to adapt and align the ideas to their own contexts. In essence, they shared that strategies to support teaching and learning while using EdTechs had to be appropriate for a specific discipline. The task might include having to align EdTech implementation strategies to meet the needs, the culture and structure of each academic field.

Regardless of the positioning of the EdTech staff, close working relationships between EdTech, academic development and IT was noted as being crucial to the uptake of EdTech. There was a notable problem in some of the institutions around ensuring smooth communication between IT units, who were responsible for the support of hardware and software; academic development centres, responsible for the educational development of staff, students and curricula; and the EdTech unit, wherever it was placed (IR024, IR021, SR39Q5). It was evident from the data that the structural arrangement of EdTechs varied across institutions with some working in well-established units with relatively strong institutional influence and others not, which had an effect on the uptake of EdTech.

5.5 EdTech staff titles and appointment types

The titles of EdTech staff varied greatly with some institutions calling all those working in the unit, 'educational technology practitioners' or 'educational technology facilitators' or

'educational technology developers' (IR001). However, others had specific titles depending on their precise job description, for example, academic developers (SR56Q8, IR001), e-learning practitioners (IR017, SR38Q14, SR57Q12), educational consultants (IR019), programmer, web developer, trainer, researcher, lecturer, strategic planner, systems engineer (IR021), instructional designer (SR21Q23, SR53Q5, SR66Q22, IR012, IR014, IR015), e-learning specialist (SR66Q12), learning designers (IR016), curriculum and learning development specialists (IR018) and educational technology specialist (SR31Q12). Thus, the EdTech staff were often named differently at the different institutions (SR66Q12, SR45Q23, SR39Q24). Regardless of the names used for EdTech staff, there was a consensus across the data that they played an increasingly important role in higher education:

> [They] are at the heart of the enterprise. I think they are – as the education increasingly goes online, I think that instructional designer or learning designers as I prefer the term, are – the foundation, I think they're the core of the project. I think they are more central than any other person, I mean other than the academics who are the content experts. I think they are – there's a real need for and a shortage of good learning designers (IR016).

A key issue that emerged from the data was the basis on which EdTech staff were hired and the relationship between this and their institutional credibility. In some institutions, EdTech staff were hired on contract rather than in permanent positions. One participant mentioned that 'most of the people in my unit are third-party funded' (IR003), and it seems likely that this funding was in the form of the earmarked university capacity development grant. Because such grants are project based, they fund contract positions rather than permanent positions.

Furthermore, in some universities, EdTech staff were hired in administrative posts and in others they were hired as academics. Administrators are generally not required to hold high academic qualifications, they are not expected to do research, and they are expected to follow other administrative job requirements around office hours, leave, and performance management. In some cases, the EdTech staff appointed to support academics in the use of EdTechs for teaching and learning were not qualified to hold an academic status, as they did not have a PhD or in some cases a masters qualification. There is research indicating that some of the problems EdTech staff had in developing relationships with academics necessary for

them to work together related to the identities and credibility of EdTech staff in the institution (see, for example, Skead, 2018; Hodgkinson-Williams & Czerniewicz, 2007). There were some concerns that some EdTech staff did not have sufficient pedagogical expertise to guide pedagogical considerations around the use of technology (IR004) and this indeed seemed to be the case where EdTech staff saw themselves as technical support rather than as academic staff developers. But the likelihood of EdTech staff having such educational expertise was constrained in cases where their appointments took the form of administrative posts. Where the EdTech staff were hired as administrators, it seemed they were more likely to be understood as providing technical end-user support. Where they were hired as academics, they were more likely to be seen as academic colleagues providing academic development.

According to Twining, Raffaghelli, Albion and Knezek (2013:443), academic development staff 'need to be solidly grounded in relevant education theory, including philosophy of education, learning theory and management of educational change'. This expertise would enable them to master the skill of applying theory to practice, as required in any educational setting. The need to combine pedagogical knowledge with the use of educational technology was indicated as necessary for EdTech staff to be taken seriously by the academics with whom they worked (IR010). However, as one participant indicated that the:

> … role of an ID [Instructional Designer] is fuzzy or confused. Instructional designers cannot be two people in one. So [this is] the reason we end up being type-caste as technologist (IR018).

There was a need in many of the institutions for a more clearly articulated EdTech identity to be disseminated across the university if the EdTech staff were to be able to take on this complex role.

The appointment of EdTech staff as administrative support enabled their being positioned as 'technical people' (IR004). And as such, they were regarded as having no background in the scholarship of teaching and learning. Many of the respondents who were EdTech staff themselves indicated that their value was understood to be only in relation to technical skills and knowledge of the Learning Management System. They were not recognised or valued for their expertise in education, an issue which has also been identified in the literature (see, for example, Hodgkinson-Williams & Czerniewicz, 2007):

> Unfortunately, there was a discord in acceptance of the role of 'support' staff in particular 'technical support staff' as a group who could teach teachers about teaching, as well as from [our] management who could not see beyond the delivery of the system (IR004).

This positioning was then viewed as a constraint on their agency because their positioning as 'support staff' constrained the extent to which they could work on educational issues with academic staff.

While the data indicated a general gratitude by academics for the support from EdTech staff, there was evidence that in many cases this support role was understood only in the narrowest technical way. This emerged from multiple mechanisms, as are discussed in this chapter and Chapter 6, but at least in part, this was related to the nature of EdTech staff job descriptions and institutional positioning as administrative staff and, in some cases, to their lack of academic qualifications and the limits of their educational experience. The structural positioning of EdTech staff as technical support staff seemed to play a major role in the extent of their acceptance and valuing by academics. Where, in the domain of culture, the successful use of educational technology was understood as simply requiring technical expertise rather than as entailing educational considerations, then their appointment as administrative staff was enabled. And in what Archer (1995) calls a 'complementarity', where EdTech staff were appointed as administrators, their role was seen to be end-user support rather than academic development.

As indicated, in cases where EdTech staff were appointed as academics, the data suggested that their work generally went beyond providing end-user technical support to include support for pedagogical and curriculum decisions, but it also often went even beyond this to include the EdTech staff doing research and undertaking teaching. Some of the respondents described their responsibilities as including:

> Conducting e-learning research (SR2Q5, also SR6Q5, SR13Q5, SR7Q5).

> Being involved in the PG Diploma in HE module, facilitating on the importance of curriculum alignment (SR23Q5).

> Facilitating the e-learning elective and selected sessions of the Post Graduate Diploma in Higher Education, supervising postgraduate research and participating in research on the use of ICTs in teaching and learning in HE (SR20Q5).
>
> Ascribing metadata, electronic and scholarly publishing, research, research support (SR37Q5).
>
> Having a masters [Masters in Computer-Based Education] qualification was being based not on the tool, but on teaching and learning (IR018)
>
> Preparing lectures, giving them, keeping up to date with technology, doing research on how technology is used, supervising students with their research and mentoring software development project teams (SR5Q5).

In some cases, EdTech staff and the academics with whom they worked undertook educational research together and presented this at internal and external conferences as well as through co-authored papers:

> We encourage lecturers to continuously reflect on their practices and often collaborate in research with them (IR022).

A number of EdTech staff were already in possession of a Postgraduate Diploma in Higher Education (PGDHE[8]) and doctoral degrees (PhD), and others were in the process of obtaining these qualifications. Working with EdTech staff who had academic qualifications and educational experience was valued by many of the academics with whom EdTech staff worked (SR20Q8, IR024). Academic staff seemed to value working with EdTech staff who were 'one of them' and who had a clear academic identity.

There was some evidence that where the EdTech staff were positioned as administrative staff, they were discouraged from studying further but some chose to do so anyway as part of their own 'personal project' (Archer, 2003) or to enhance their future employability (IR004, IR005).

[8] The Postgraduate Diploma in Higher Education (PGDHE) is a part-time programme offered at an honours level. The aim of PGDHE is to assist academics to enhance their teaching, assessment and curriculum development practices by developing their knowledge of Higher Education as a field of study.

Where the university positioned EdTech staff as technical support, it seemed there was a sense that an academic qualification was not essential to their work.

Data revealed that respondents who held management positions (EdTech unit directors and managers) were beginning to use their agency to activate the notion that while EdTech was about the use of technology, it was also fundamentally about education. As a result, educational qualifications and expertise were essential for EdTech staff (IR014, IR016, IR024):

> I mean I've tried very hard in our appointments to make sure that our technology staff do have a strong teaching and learning foundation and those that have come in at quite a junior level, part of their contract has been that they actually do the Postgraduate Diploma in Higher Education (IR024).

At the institutions, there was thus a call in the data to appoint EdTech staff with educational expertise, rather than (only) IT qualifications and experience, and even for them to have discipline-specific qualifications, such as history or chemistry.

5.6 Disciplinary and educational expertise of EdTech staff

In many cases, EdTech staff in these centralised units were allocated to work within specific faculties or cognate fields:

> Engaging with academics in the Faculty of Health Sciences and the Faculty of Accounting and Informatics to advance the integration of digital technologies in learning-teaching interactions (SR39Q5).

> Assisting lecturers in the use of learning technologies in the Faculty of Economic and Management Sciences (SR54Q5).

This arrangement did not necessarily mean the EdTech staff were specialists in those fields, but rather that they had built up a relationship with academics in that faculty or set of departments through ongoing work with them. This was common in the previously advantaged universities which all had well-resourced EdTech units, with the exception of a very small previously advantaged university where the EdTech staff worked across all faculties.

Having disciplinary and educational expertise was seen to be a key means of enhancing the credibility of EdTech staff:

> Examples from the faculty also definitely promote the use of learning technology because the other thing is I think having the correct background makes a difference because I'm from the Science background and normally when I go to a department, … they tend to think that you don't have the ... Normally, the first question that I get…, when I went to all the departments is they ask me, 'What did you study?' … so, I said, 'Well, I did a degree in Education and I did a degree in Molecular Biography and I did a MBA'. And then they say, *'Ah, you're a scientist, you know our field. We can work.'* … So that is also why I think using examples from the faculty where it's people from their field that they can relate to. … So, I mean if I were to employ somebody working in learning technologies, I would definitely – so like I said, it would be somebody with passion and enthusiastic - but I would definitely choose somebody with a science background or a medical background (IR014).

The data shows that academics valued being supported by a person within their particular or cognate field, but more significantly, they valued working with EdTech staff who were academics themselves and brought educational experience along with their technical skills:

> First and foremost, we must consider that, for example, for me, I'm a nurse and the instructional designers, they are trained and their education was based around designing those tools and the use of those tools. For me, as a nurse, nurse educator, I know the curriculum which nurses need but I don't know which tools can be embedded in my teaching. For me, I think collaboration with the instructional designer is very important because for her, she has this knowledge of the e-tools or the technological aspect of this curriculum. But for me, I know the content and I know the context where the teaching and learning [of] nurses occurs. So, of importance is for us to work hand-in-hand with them so that their work enhances ours and our work is based on what they have in there as technological, based in education. They know which tools to use on issues of the content (IR008).

This participant further elaborated on the need for and value of EdTech staff:

> I see a very dire need, a very dire need for that. I see them, they should, in other words, if we are to do it my own, it was to say when I design the study guide on whatever, I need to sit with the instructional designer and to tell that these are my things for this module. And then, where can I embed for example, discussion forum, where can I embed a weekly discussion group? Those are things that if it is according to me that's what I have to do (IR008).

Where EdTech staff offered very generic training and were unable to discuss potential pedagogical implications, it seems they could be dismissed by academics as not really understanding their realities 'on the ground'. It was noted that 'the provision of generalised training and software familiarisation training is seen to be lacking in terms of disciplinary relevance by some academics' (SR39Q25). Usually, academics (upon completion of each EdTech-related workshop) had autonomy to structure (design and develop) their online course activities to suit their various disciplines. However, during the workshops, EdTech staff were ideally able to meet different needs and share faculty or discipline specific examples:

> You cannot therefore use the same technologies for each and every, different faculties because they teach differently and they do different things. For example, a practical lab cannot have the same screen that they use in a theory class because in a theory class you will find that they will project whatever they're presenting on the slide. But in a practical lab you'll have to be able to see, for example, … the dentistry students, they have different cameras which can see in the mouth and so on. So whenever the lecturer is working on those teeth and so on, it has function to zoom in from – and sometimes they also have X-ray cameras, which can display from the outside (IR002).

There was general agreement that the design of any form of staff development, including that related to educational technology, 'would also benefit by taking the discipline-related values into consideration and would add legitimacy to the academic development programmes' (SR39Q25). The capacity of EdTech staff to be familiar with every discipline-specific app or software program was limited, however (SR58Q18).

It emerged that sometimes the EdTech staff worked in teams in their central unit to establish the best advice and solutions to support academics but they often also worked individually with an academic to determine and implement the most appropriate form of educational

technology for their specific course. In such cases, EdTech staff often undertook a range of activities that were more academic than administrative in nature, including researching and identifying the functionalities of the EdTech tools and how the tool could be applied in teaching and learning situations. The various roles played by EdTech staff seemed to be at different levels, ranging from being a researcher, compiling guidelines to use a tool, trainer (e-learning facilitator) and continuously supporting academics in their teaching needs:

> We would first see, are we able to offer it? What is the tool about? We would research. … your role would include being an adviser to a lecturer on educational technologies but then you're also doing research in terms of what is already out there, what can be used. And then based on your research you would write up, you would find a way to get to know the e-tool specifically. Then from that knowledge you would draw up your training plan … your training programme. From there you would work with your team members … this is the e-tool, this is what it can be used for. We will discuss in our team …. Then we do a train the trainer. … you could also use it for this particular concept or discipline and then we would then offer it maybe for that one lecturer or the lecturer would bring his department. … So, the roles are changing constantly and because of the technology that's also changing. So, you can find yourself overwhelmed because there are lot of things out there, (IR015).

While there were institutional differences in the degree of educational expertise that EdTech staff had, there were also differences in the extent of interest from academics, an issue to which is discussed in Section 5.7.

5.7 Working with academics interested in EdTech

Among the mechanisms identified in the literature as enabling the successful use of EdTechs was the self-efficacy and determination of the academics (van Acker, van Buuren, Kreijns & Vermeulen, 2013). In Archerian terms (Archer, 2003), this can be considered as a complementarity between the 'personal projects' of specific academics and the EdTech staff which enable a partnership to emerge:

> We basically had an awareness campaign and we found what was useful is that people know that there is support. …. So, making sure that people are aware that there is support. They can come to someone's office or someone can go to their office to help them. That is what positively influences the uptake of educational technologies at our campus (IR015).

There seemed to be general consensus that if there was no interest in the use of EdTech, there was no point in trying to work with such academics:

> There are still lecturers who feel that they are sage on the stage and they prefer that you don't tell them or suggest how to do things better or differently (IR007).

Even when working with individuals who had a personal interest in using EdTech, the ability of EdTech staff to voice opinions emerged only when 'all of us [EdTech staff in that institution] have educational backgrounds' (IR007). Thus, the capacity to combine pedagogical knowledge with expertise related to technology, placed the EdTech staff in better positions to engage with academics (IR009, IR010, IR11, IR015, and IR007):

> I can't do without them, if really I want to implement or take forward e-Learning … we should complement each other … In other words, I don't want to give them much work. I am not saying we should say they must design our study guide… But what I don't know is which tools I can use (IR008).

Therefore, it seems apparent across much of the data that support for the use of educational technologies had shifted from providing technical support to focusing more on how technology could be used to meet the educational goals. This has also been noted in the literature, for example, Beetham and Sharpe (2007). However, this shift was not evident across all the data. In cases where the EdTech staff were appointed as support staff, or were IT staff who took on the role of supporting educational technology alongside general technology support, they sometimes battled to be accorded credibility around educational issues:

> When we fail to [just] work on the tool they become amazed as to what is our role exactly, like 'We are confused' (IR018).

Most of the engagements between EdTech staff and academics took the form of individual consultations and workshops, though in a few cases EdTech staff worked directly with students. I now consider each of these forms of engagement in Section 5.8.

5.8 Individual consultations with academics

Participants noted that much of their work was through one-on-one approaches where academics made appointments with the EdTech unit staff for individual consultations. During these tailor-made, individual sessions, discussions included planning, brainstorming and actual implementation of technology to a blended course or to an entirely online course.

Some academics were just starting out and keen to experiment with educational technology but required support to do so, 'I just want to start, help me to start' (IR021), needed to be supported to build confidence in using technology and needed 'a lot of hand holding' (SR3Q19). It seemed that there were many issues related to academic confidence in the use of technology. Some participants indicated that much of their work related to ensuring that academics were confident with using technology for pedagogical purposes (IR003). Alongside anxieties about using technology, was an ignorance about the possibilities technology offered. The EdTech staff indicated, however, that in some cases, academics simply did not understand the capacity of the technology for materials development:

> There was one lady who wanted to be accompanied by a security guard to go to the lecture hall, to [record] her lecture to absolutely nobody … not knowing about any other tools that are out there. She could have done in the comfort of her own home (IR024).

But other academics were already adept at using educational technology and looked to EdTech staff as colleagues who could keep them abreast of new possibilities.

Some EdTech staff developed short training videos or screen captures of frequent processes, which they used in their consultations with lecturers:

> … training is a big part of it, not necessarily workshops, long hours but also, small bits and pieces, digestible pieces at a time and that can happen online as well. So one

> doesn't have to spend a lot of hours and make them – so I think how one can actually think of that, small bits and pieces of teaching people how to do a certain thing. Just something that they can listen to and 'Oh, I can do this and I've done it now quickly in my office' (IR009).

In some cases, consultations were entirely focused on technical aspects, which, while a necessary condition of the uptake of EdTech was seen by most EdTech participants in this study to be restrictive because the implementation of the technology needed to be aligned to and respond to educational contexts. The extent to which such individual consultations or workshops, took place and the extent to which they were focused on pedagogical aspects varied greatly across the data.

5.9 Staff development workshops

In most of the institutions in this study, academic development workshops were available that focused on educational technologies (IR010; IR012; SR69Q5). Workshops were arranged for professional development to up-skill academics on how to use the available general EdTech tools as well as to train them in the use of discipline specific multimedia tools:

> We have a whole spread full of training, a whole menu that we present. I think there is at the moment 11 courses that we are presenting to staff (IR009).

> We are creating a website with the different types of pedagogies. We are going to provide departmental training to give an overview of what learning technologies are used and how is it being used and then develop specific training sessions (SR8Q23).

Some EdTech respondents highlighted that the workshops provided for beginner levels up to advanced levels:

> We create a module for them, a playfield for try-outs and training sites where they can do their own thing and play. And then we have the workshops, different workshops on different levels ranging from basic, intermediate, to advanced levels where we bring people into a lab for hands-on workshop (IR021).

It was notable in the data that many academics wanted practical workshops focused on technical support, such as 'support in dealing with technical challenges pertaining to the LMS' (SR58Q19). Technical anxiety about using technology was repeatedly noted as constraining the use of EdTech. This meant that the focus of workshops was often on gaining confidence in the technology itself (IR022 and IR010):

> I think lecturers perhaps, they wanted to do something but they didn't know where to start (IR024).

As indicated earlier, the EdTech respondents reported that they generally worked with interested academics who sought out individual consultations or who voluntarily attended workshops advertised widely. Because successful use of technology for education was seen to be dependent on the knowledge of an academic personnel and the pedagogy that went with that knowledge (IR008), there was a strong sense that it was only worth engaging with academics who showed an interest in using technology to enhance their practice (SR70Q21). Salmona, Jones and Armellinia (2008) suggest that academics should have independence in using the technology tools and not be instructed on what to use and when to use these educational technologies, as this could lead to resistance.

There was a sense that individual agency was a key mechanism in the uptake of EdTech. If the use of technology was not aligned to the 'personal project', then it was unlikely to succeed. EdTech staff indicated that the uptake was dependent upon the 'individual user if she/he is willing to adopt educational technology in their classroom' (SR75Q21). One participant noted that the 'older lecturers… really don't see the need for it' (IR024). Some participants noted that many academics 'teach in the way they were taught' (IR004), and had little interest in considering 'what blended learning would look like' (IR003).

While EdTech staff indicated the benefits of working only with those who elected to use technology, in some cases, a head of department or other 'EdTech champion' would request a departmental workshop (IR001), and this would then include individuals who might not have elected to use educational technologies otherwise. In some faculties, the uptake by the staff already existed and was driven by the academics (IR010) who then sought out engagements with EdTech staff. While other faculties had conflicting and contradicting relations with

EdTech staff. In such cases, there was even direct resistance. One participant indicated that there was an attitude of 'Who are you to tell me what to do?' (IR010).

Departmental workshops afforded the opportunity to demonstrate to academics who may not have considered the use of educational technology 'how to move away from a traditional view to a more open view' (IR021). There was a sense that workshops on the use of educational technology use could also '… stimulate deeper engagement [with teaching]' (SR34Q19).

The workshops facilitated by the academic development units offered awareness on how educational technology could augment teaching and learning:

> … in our workshops, we normally link technology with pedagogical knowledge (SR28Q23).
>
> In our workshops, we include discussions around pedagogy, student diversity and technology (IR024).

In such cases, educational technology was seen to be one aspect of larger considerations around curriculum and pedagogy:

> … educational technology is one strategy that can be helped and which can be used and employed along with a whole lot of other strategies, which include instructional design, pedagogy, assessment, formative assessment and so on (IR016).

During some of these workshops, there were opportunities for academics to build their courses and incorporate tools applicable to their teaching scenarios:

> We have different workshops to address the different needs of the academics from, module design, tool mediation, collaboration, grade centre, Turnitin and many more (SR23Q16).
>
> We arrange workshops for professional development to up-skill academics on how to use tools available on [my institution LMS] as well as other multimedia tools (SR58Q23).

There was ample data describing the successes of workshops in supporting academics to take on pedagogical practices using technology:

> … and also in terms of assessments, there were more academics using assessment tools … which were not previously used to their capacity (IR006).
>
> … continuously exploring on the use of various e-tools (IR008).

It was noted by some of the EdTech staff that for the pedagogy they used in the workshops, they needed to provide exemplars of the use of educational technology if they were to be convincing and inspiring for the academic attendees:

> Educational technologists include in their workshops and interactions with staff, various means of accessing online information … which includes sharing knowledge (SR39Q24).
>
> … integrate as many learning technologies … in order to model to lecturers the kinds of things that you can use technology for (IR024).
>
> … to constantly think of new ways in getting them [lecturers] involved, new ideas with regards to training and the use of technology in your teaching and learning (IR009).

The voluntary nature of EdTech usage and the autonomy in selecting what technology to use was noted:

> Lecturers make their own choices regarding the what, where, how and when to use educational technologies for teaching and learning (IR021).
>
> … we are not prescriptive in this regard, lecturers are free to choose what is fit for purpose (SR70Q12).

There was also reference to a concern that much of the EdTech support was restricted to the institution's specific LMS, and there were calls that this should not be the only supported e-learning tool (SR7Q18). In such cases, respondents saw the EdTech workshops as being too strongly focused on the technical implementation of one specific system:

> At this moment, I see them as call-centres because when staff have got some technical problems, they contact them. But as far as engaging with some educational technologies, related issues, I think they are still lacking there. They are not so much

> visible. They might have those capabilities and knowledge and skills but I think maybe the way they are rolling out the training is too technical (IR013).
>
> The professional development workshops that should integrate pedagogical practices with the use of technology, I don't see them happening in that way, what I see happening is how to use the system on a very, very basic way. I don't see an exploration of what tools are capable of (IR019).

On the one hand, EdTech staff indicated that some academics called for more educationally-focused support rather than technical instruction on the use of the LMS and, on the other hand, it seems some academics welcomed support for the technical aspects of educational technologies but refused engagement on pedagogical aspects:

> I like software training only and don't waste my time with all the talk about pedagogy (IR011).

Some academics seemed not to value deliberations with EdTech staff about the pedagogical considerations underpinning the use of technologies. It emerged that in some cases when academics signed-up for EdTechs workshops, they assumed there would only be support with the technical part and they regarded discussions about pedagogy as a time constraint or as beyond the domain of expertise of EdTech staff. In contrast to this, others valued support with considering the teaching, learning and assessment approaches that they planned to use the technology for:

> Yes, we love the pedagogy, without the pedagogy it's not a full picture (IR011).
>
> Edtech academic staff development must be agile with the emphasis on developing criticality and sound approaches to T&L [teaching and learning] rather than on technology itself. The principles of criticality and sound approaches to T&L [teaching and learning] are applicable across technologies (SR20Q23).

These differences emerged from multiple mechanisms and could be found within a single institution, but at least in part depended on how educational technology was understood within the institution, namely, as a set of technical skills, with educational issues as a very secondary concern, or as a pedagogical consideration with the technology as the vehicle for attaining pedagogical goals. Furthermore, if the EdTech staff were positioned as

administrators, it was less likely that they would be considered as providing academic development.

The nature of the relationship between departments, faculties and academic development departments/EdTech units was a key cultural mechanism that enabled or constrained the expectations of the nature of the workshops and thereby conditioned the uptake of education technology:

> … so, it's a group of people who are experts in their field who support the lecturer in designing and developing the learner solutions for the students (IR019).

While EdTech workshops were available in most of the universities, there were great differences in the extent to which these were focused only on end-user training for specific programs, such as the use of the LMS, or the extent to which these were academic development workshops that looked at educational issues related to the use of technology. Such differences emerged in some cases within a single institution where different workshops attended to different issues or these differences emerged from the different ways in which EdTech was framed in the institution as a technical support function or an academic development one.

The EdTech respondents indicated that they also used the workshops as an opportunity to flag their educational support role compared to the end-user, technical support that was then flagged in the workshops as being the primary focus of the IT department. One respondent indicated, for example, that in the workshops, they pointed people to the:

> ICT helpdesk where people can log a question and ask for help (IR021).

But many technical issues, especially regarding the institutional LMS required 'continuous engagement … to explore ways to handle technical challenges' (SR58Q19). There was also evidence that in some cases academics needed technical support on programs that those who worked in IT saw as falling outside of their responsibilities. The use of WhatsApp and Facebook, for example, was common and generally simple to use but where technical problems arose these would be addressed by EdTech staff because IT staff indicated they did not offer end-user support for these programs or they raised concerns about security risks in using such programs with students (SR58Q19).

Over and above, the individual consultations and staff development workshops, some EdTech staff also offered support to students.

5.10 Working directly with students

While in many institutions more focus was given to lecturers to empower them with EdTech skills, some also had student EdTech programmes to promote these skills. The following participant, for example, ran computer literacy courses:

> Our main clients are our students. We want our students to graduate and we want them to be employable when they graduate (IR015).

Some institutions had structures readily available to support both academics and students in the use of EdTechs (IR007), while in others, the EdTech staff made clear that they did not have the capacity to work with both academics and students:

> We're a very small unit and we won't be able to basically do these things for all students and all lecturers (IR015).

It was also assumed by some participants that these students were 'millennials' and came to universities with computer skills hence it appeared not of a priority for EdTechs units to offer EdTech skills to students, an issue that is again discussed in Chapter 7, Section 7.3.

Across all these activities (individual consultations, workshops, and working with students), there was a difference in the extent to which EdTech staff referred to educational theory as being relevant in their work.

5.11 Theoretical underpinnings of EdTech development

It was evident that some EdTech staff drew explicitly on educational theory when planning their support offerings:

> The workshops we offer… are theoretically grounded (SR23Q23).

In some universities with well-established EdTech units, respondents were able to articulate a specific theoretical framing they used to conceptualise the use of educational technology and of how they supported its uptake. This included, for example, a focus on authentic

learning, constructivism, and Critical Historical Activity Theory (CHAT). It was noted in the data though that the theoretical approach should not be 'monolithic, or tied to a particular technology, but rather heterogeneous, device-independent and striving for criticality' (SR20Q8).

Although researchers in the field of educational technologies in South African higher education institutions indicate that EdTech use does not have its own governing theory (Hodgkinson-Williams & Czerniewicz, 2007), there was evidence that some EdTech staff drew from a range of educational theories in their work. For example, IR005 elaborates on the use of CHAT to engage with academics on their choice of educational technology:

> For instance, if they give students a task, we are saying they can't just give students a task without the learning outcomes. You draw back on the outcomes-based education to say these are the outcomes, what is your assessment criteria? And with the assessment criteria, we are emphasising the fact that assessment criteria is about helping the students achieve the set outcomes. So, we are saying, what is it that you are doing in order to help the student to achieve the set outcomes. So, if you're talking in the language of CHAT, you are saying what is the mediating tool that you are using to support the students? So, if you give tasks to students, maybe you expect them to write an essay, you need to give them a mediating tool. The easiest mediating tool that everybody understands is a rubric, which is a tool to guide the students in completing this task. Thus, for a successful teaching and learning environment, students require a guiding tool to achieve learning (IR005).

CHAT draws on past events and experiences to consider how to promote social learning (Mukute & Lotz-Sisitka, 2012), and EdTech is conceptualised as a potential affordance. By conceptualising of educational technology as a 'mediating tool', CHAT demands that deliberations about EdTech are positioned within broader concerns about learning outcomes.

There was also reference in the data to the principles of constructivism, which recognises students as actively involved in the personal construction of knowledge. Participants affirmed that if educational technologies were correctly aligned, they could be set-up to foster a constructivist learning environment, which could enable content understanding and promote social skills (SR4Q26, SR4Q24).

Alongside reference to constructivism and CHAT was frequent reference to 'authentic learning'. Authentic learning is the theory that indicates that students learn best when given opportunities to discover events for themselves and to establish for themselves the relations between events. Pedagogy is thus focused on providing opportunities for students to engage actively with knowledge in the world.

The focus on authentic learning as underpinning the approach to the use of educational technology is evidenced in data such as:

> [EdTech] allows students to share information and collaborate on topics of interest… they [students] are also able to create their own knowledge by searching for information on their own, that speaks to self-directed learning (SR58Q24).

> … it's the interaction between the academic and the student which would then emphasise why certain information is just information and certain information is reliable and worthy of legitimate – to be considered as legitimate knowledge (IR011).

There was evidence in the data that authentic learning was promoted by using technology to give students real-life experiences impossible in the classroom:

> … you can't always take the students to the hospitals to go and learn (IR005).

Technology was used to offer simulations of real-world environments. Thus, students were made aware of other real-life situations. Authentic learning is believed to be applicable across academic disciplines (Lombardi & Oblinger, 2007) and often drew on the idea of reflection as being key to authenticity. Some academics used reflective tools to consolidate and sum-up what has been learnt during the semester. Such reflective-inquiry methods were seen to assist academics to address issues which may need intervention. The philosophy of 'learning to be' (IR005) was believed to prepare students to learn about the content in the discipline and gain the practical experience in the discipline. Jerome Bruner, an American cognitive psychologist, argued that there is a great difference between learning about something and learning to be something (Bruner, 1961). If learning is understood as a discovery process, the aim of education is to facilitate thinking and problem-solving skills, which can be applied to different learning situations. This approach to authentic learning means ensuring that students can discover knowledge for themselves, for example, in flipped classroom activities where the

input from the lecturer is greatly limited and classes are structured to encourage student engagement.

This focus on authentic learning as a theoretical underpinning for the use of educational technology was seen as a means to 'change the mind-set' of academics and allow them to see that *'*Ooh, it actually – look at this interesting authentic learning example*'* (IR014). In this case, the use of authentic learning was seen to afford students with an opportunity to use real-world examples relating to their discipline to participate in an interactive online task.

The extent to which EdTech staff articulated a theoretical approach to their work overlapped with their institutional positioning and their own understanding of their work. Where EdTech staff were positioned as technical support or where they understood their role as such, there was little discussion of theory in the data. But where they were institutionally positioned as academics and understood their role as academic developers, they spontaneously discussed their use of theory.

5.12 Continuum from focus on education to focus on technology

The data discussed in this chapter suggests there was a continuum in understandings of the roles of EdTech staff. This education/technology continuum is illustrated in Figure 9.

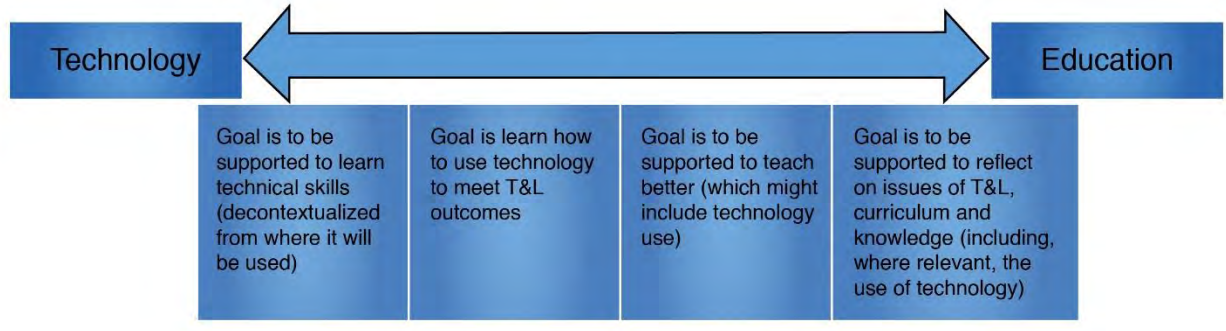

Figure 9: Continuum between education and technology

Both academics and EdTech staff could be positioned at any point along this continuum, and it may well be that they would move along the continuum depending on the specific problem they were facing or issue with which they were engaging. But it was nonetheless evident that

in some universities, EdTech was understood at the left-hand, technical end only. In such institutions, EdTech units did not exist or were positioned as part of IT, offering technical support. This was also evident in the appointment of EdTech staff in technical support posts. While there was no agreement as to the ideal position to be taken in relation to how EdTech staff worked with academics, there were institutions where EdTech was conceptually (in the realm of culture) and structurally (in resourcing of units and appointment of staff) very much in the centre to centre-right of the continuum.

Thus, it was that in some cases, it was expected that EdTech staff should only focus on technical issues:

> … it's just a pity that academics when they hear EdTechs, they just take it that you are going to support them with the use of technologies, showing them where to click. They don't expect us to encourage the pedagogy behind the use of technologies (IR005).
>
> Once you move away from the technology and talk about the pedagogy, then it looks like they feel intimidated (IR005).

In contrast, in some cases there was an understanding that the use of technology needed to respond to pedagogical needs and intentions:

> Technology can make a difference by enhancing the learning experience of students. It allows for engagement in class, self-regulated learning, flipped classrooms, adaptive learning, more authentic assessments etc. However, effective learning can take place without using any technology, it is also about the passion and enthusiasm of the lecturers and their ability to make information understandable. Therefore, the starting point in a curriculum should not be the technology, but the outcomes, content and pedagogy, around that you can decide what technology would help (IR014).

In the two long data quotes, the participants clearly indicated the need for training in technical application of the EdTech to be tied to more educational considerations:

> My role is basically to get more people on board not just to use the tools for the sake of using a tool… So, the more lecturers we can get to think differently about the teaching that way, we would get our students on board. So, that once you've dealt with the lecturer and they see, how I can make a change or how I can, maybe just use

one thing to update my teaching. That will basically be filtered down to their students. So, once we've helped a lecturer think differently and they are on board, definitely their students will come on board. So that we are there …on their e-Learning journey we are there to support. …. The students will then become better and skilled and that's what we want our nation to be; we want our nation to be e-skilled and … employable so that they can work in different fields, … So, that's our role in terms of our institution … – we can never say we've reached success and if you have gotten one group, then you need to see how you can spread that circle wider. … So, things change constantly pilot or a group of students and lecturers and we see that it works, share this with our campus community. ... So, it's a naming phase basically, naming the lecturer, the faculty, the discipline and we are sharing with the campus so then more lecturers or students would come on board, asking 'how can we also do this?' So, that's how you spread the word and that's how you get more people to basically take up but you show them that it's do-able and that you will be there to support them. … So, you're with them step by step on that journey. We always say, start small. … maybe just sharing your announcements and your notes that's fine … because you get people at different levels. … That is that person's journey at that particular time. But you're always thinking of what they can do more (IR015).

My role is to … encourage during the training, lecturers to incorporate these technologies into their teaching in class because they can be there but if they don't know how to use them then it becomes difficult for them to use. So, if the training is specifically to the engineering lecturers to be able to get things to relate what you can do with these technologies to what they are doing. So, if they find it relevant, they motivated and likely to use it. So, I believe that in some way it can encourage uptake of such technologies. My core role, I believe is to train and encourage or to train and ensure that lecturers are comfortable in the use of these technologies. Therefore, that encourages them to use them even more because if they see okay, I can do with this – they'd find things interesting, they find things easy to do then I believe they are more likely to use them (IR002).

One EdTech interviewee indicated that the selection of specific technologies needed to address the pedagogical intentions and that adopting technology for its own sake was problematic:

> I think integrating is not as easy as we may think because it needs more knowledge in the three [pedagogy, content and technology] that I've indicated, that you need to have more knowledge. You cannot just say, 'I'm going to integrate technology'. You need to know which technology goes with what content because you cannot just take Clickers[9] and use it in something else. … For example, you can look at the content and then if you see that this content it's more difficult, then you take a video. But then if you don't have that knowledge, then you will take anything, maybe Clickers or whatever and put it where it doesn't fit (IR010).

As another participant stated, 'You can't just use the technology without considering the pedagogy' (IR005). Significantly, where EdTech staff saw their role as academic developers rather than technical support, their relationship with academics was seen to be central:

> As e-learning staff, I work with academics to integrate technology into their teaching meaningfully. For me, this means building relationships with academics and going on a journey together. Exploring different ways of using technology for different purposes and different students. We can bring different skills and experiences into the process, but we are learning side by side (IR020).

The credibility that some EdTech staff enjoyed in their institutions enabled such strong relationships with academics:

> … whenever you read something concerning technology, you just send it to the faculty. We share. That's how we try to help (IR010).

[9] Clickers are tools used by student to respond to multiple choice questions for formative assessment purposes during a lecture. A lecturer will then check in the system how many student responded correctly, then clarify any misconceptions.

5.13 Conclusion

Most respondents in this study indicated that in their view, the use of educational technology could increase the quality of education. However, the uptake of EdTech 'depends' on the context into which it is introduced (IR016, IR009, SR75Q21, SR3Q26, IR022). EdTechs were seen as a mechanism, an approach that academics could use to augment teaching and learning, but its uptake depended on how it was incorporated or integrated into the curriculum or into a learning programme.

In this chapter, I have discussed who EdTech staff were and where they were positioned in the institutions and argued that this was a mechanism that conditioned the roles they played. Across all of the issues discussed in this chapter, a tension emerged in the extent to which EdTech staff were seen to be technical end-user support or were seen to be academic developers. While the study participants took different positions along the continuum, it was evident that being able to engage with pedagogical deliberations emerged at least in part from the ways in which EdTech was structured by the institution.

In Chapter 6, I continue to look at the institutional positioning and conceptualisation of EdTech by reflecting on the data related to institutional policies and strategies. I then consider the different understandings on the use of educational technology in the universities.

Chapter 6: Data analysis

6.1 Educational technology as enabler of quality education

There was much data from EdTech staff and academics about the role technology could play in enhancing epistemological access and enabling student engagement. For example, there was a view shared by some that technology was beneficial because it allowed for repeated viewings of a lecture (IR001, IR003, IR011, IR016, IR018, IR021). Students who needed more time to grasp a concept could work through that material asynchronously and at their own pace (IR003, IR018, IR023, IR024). There was also a view that it allowed for opportunities for authentic learning, as discussed in the previous chapter, because students could be provided with simulations of real-world processes and the technology could maximise opportunities for reflection, which was seen to be fundamental to authentic learning. For example, there was frequent mention that technology could facilitate students to be co-creators of knowledge (SR23Q24). This idea of educational technology enabling more interactive learning and student engagement is also frequently mentioned in the literature, which looks at how technology has increased the use of student-generated content, such as wikis, blogs and podcasts (for example, Lau, Yen & Wah; 2014; Snowball & McKenna 2017).

It is important to note that where technology was seen in the data as a means of improving the quality of teaching and learning, it was not seen as a necessity for its own sake but rather as a means to an end. Some EdTech staff respondents indicated that they saw a key part of their work being supporting academics to consider technology as just one aspect of their teaching approach, which needed to be carefully selected according to pedagogical goals and student needs (IR021). For these EdTech staff and their academic partners, the selection and implementation of the technology entailed considering a number of issues beyond technical competence of the tool itself:

> We know there are many tools and functionalities in the system that can advance the access to new knowledge and resources and things like that. But still, it comes back to the *how* are we using it and how is it planned and structured for the student online to make it easy and not to overwhelm them and things like that (IR009).

> … [academics] have to plan properly and plan the outcomes so that the tool that [they] are going to use will match with the outcomes (IR020).

The technology was implemented as 'a blended learning approach to teaching-learning interactions between academics and students, initiated to integrate ICTs effectively in a pedagogically significant manner' (SR39Q8). This understanding of the technology as a vehicle for a particular pedagogical intention meant that academics (with the support of EdTech staff) needed to select the appropriate tool and not simply use the same approach for all activities involving technology:

> Many other technologies are in use for T&L [teaching and learning] which means that academics are afforded with a variety of EdTechs to enhance their teaching (SR20Q8).

For these respondents, the use of technologies was not just for the sake of using them, but to enhance the way teaching was done. These respondents in the study noted that educational technology should not be implemented simply because it was available because, after all, 'effective learning can take place without using any technology' (IR014). The use of technology therefore had to be driven by the curriculum and the nature of the target knowledge:

> [EdTech] not as a stand-alone method but blending with other ways of teaching and learning. And then I think it can improve the quality very, very much (IR008).

It was noted that some subject matter experts struggled with aligning the affordances of tools to their instructional and pedagogic strategies (SR34Q18), and that the work of EdTech staff required some awareness of pedagogical issues, as was argued in Chapter 5, Section 5.11. This pedagogical awareness was supported during the interview with one of the respondents:

> It's what you do with the content that counts. That online facilitation the lecturers need, is something that will grow over time, but you [EdTech staff] need to create that environment for them [academics] to be able to grow and the same for the students (IR021).

The technology was thus not as an add-on gimmick but was 'infuse[d] in our curriculum' (IR008) where it was most likely to enhance the quality of teaching and learning.

Ensuring alignment between the pedagogical intentions and the use of technology also meant taking students' needs into account (this issue is also discussed in Chapter 7, Section 7.2 as well):

> If it addresses a specific need and supports a course designed with specific students in mind, it certainly can improve quality (IR022).

To a large extent, the uptake of technology seemed to have emerged from the agency of individual academics who brought this understanding that technology was a useful tool in their attempts to develop strong curricula and student engagement:

> … it will also depend upon the attitude and the belief of the user in as far as using it because it's a tool, it's not automatic (IR020).

> … it is also about the passion and enthusiasm of the lecturers and their ability to make information understandable (IR014).

> I have observed them [EdTechs] enhancing motivation a lot to both lecturers and students (SR62Q26).

> I am very passionate about it. I didn't even realise I'm passionate … Like for me it saves, it saves me a lot of time … I will look for clips and then it is so easy when time comes for the lectures, I'm ready (IR008).

The focus of educational technologies seemed to be on what it could bring to learning that differed from what could be done in a normal face-to-face lecture. EdTech use seemed valued when it could extend what was learnt in a physical lecture room by offering a variety of activities that were enabled by the technology. For example, the technology was used to support team-based learning (IR004, IR018, IR021), extending debates to allow discussion (through an online discussion forum) to continue outside the classroom (IR018, IR019, SR42Q24) and offering students access to tools (such as a Wiki tool) to develop engaging learning resources (IR004, SR8Q24, SR1Q24). In such cases, the technology was seen to foster student engagement by having them actively engage with the learning materials and co-create materials (SR42Q26, SR50Q8, SR7Q241).

Respondents who understood technology as a facilitator of educational engagement were also clear that using an LMS did not in itself constitute much by way of 'educational technology'. They expressed the need to use the LMS in ways designed to ensure participation and not just as a space for learning materials:

> [The LMS] is not the only technology. That's actually just the platform to help you manage your course (IR001).

In contrast to those who saw EdTech as a useful tool for enhancing the quality of teaching and which needed to be used in ways appropriate to the pedagogical goals and students' learning needs, were reports of academics who saw the technology in simplistic or instrumentalist ways. These understandings were bemoaned by the EdTech participants, as is discussed in Section 6.2.

6.2 Educational technology as offering a repository for materials

The focus on pedagogical aspects of EdTech use was seen to be important to ensure that the LMS was not just a 'dumping ground' for materials (IR003, IR011, IR018, IR021), which was a common concern among the EdTech staff, for example:

> … it is mostly used as a repository (SR5Q26).

> … only lecture notes or PowerPoint slides were added (IR001).

The focus on the LMS as the only form of educational technology and the use of the LMS simply as a space for storage of course guides and learning materials was frequently referred to by EdTech respondents:

> [Putting materials on the LMS] means that all students have access to the same materials. But it isn't as great as it's made out to be (SR5Q26).

> They don't think it through; they don't think about how they can make the content more interesting for the students (IR005).

> Only a few of them go beyond [putting materials on the LMS], and we are hoping that as maybe, the profile of the academics changes that also will change (IR001).

The use of EdTechs for 'dumping notes and content' (IR003, IR005, IR019) was noted as unlikely to nurture student engagement and as an under-utilisation of the pedagogical affordances of the technology.

Respondent IR019 shared the perception that her institution was using EdTechs as an administration tool to manage classes, rather than as a tool for learning. IR019 indicated that as a result of this, academics uploaded study guides and unmediated resources onto the learning management system in compliance with institutional requirements, but did not take pedagogical considerations into account:

> I have not come across anyone who uses a different tool for learning [other than the LMS]. Our system is not enabling. Our assessment tool is almost dysfunctional, that is in my opinion. I am saying dysfunctional because I know how to work it in a way that it will enable this access to knowledge but from where I am standing, the way the tool is currently used in the system, it does not enable access because all academics do is to upload the study guide to the system. It's like converting paper to an electronic format (IR019).

Alongside the concerns about using the technology simply as a repository, rather than for enabling interactive learning, were concerns that some technology was being used in instrumentalist ways. For example, several respondents discussed the use of Turnitin, a text-matching software program (IR001, IR004). This tool was integrated into the LMS in a number of universities, but it was generally misunderstood and misused. Respondents highlighted that this software tool was purely used for students to scan their written assignments to determine the similarity to sources used and to meet certain similarity index percentage requirements (IR001). This poor practice meant that students would only engage with the tool by resubmitting revised versions of their work until it met the required percentage.

This serves as a useful example of how technology, when used in instrumentalist ways, could actually constrain rather than enable good teaching and learning practices. As has been shown in the literature, the percentage on a Turnitin similarity report bears only partial correlation to potential plagiarism and it is only by looking at the whole report that the existence of any plagiarism can be established (Mphahlele & McKenna, 2019; Bretag & Mahmud, 2009). Furthermore, the software cannot detect paraphrased plagiarism. The literature suggests that setting a percentage limit on the similarity index of Turnitin is not only a misunderstanding of the software, it is the kind of instrumentalist use of software that undermines students' engagement with knowledge (Bretag, 2016; McKenna, 2022; MacDonald & Carroll, 2006).

Mphahlele and McKenna (2019: 1079) argue that Turnitin is often used as a plagiarism detecting tool rather than for student development:

> The implication is that, if Turnitin is primarily used as a policing tool, students are not only denied access to nuanced pedagogical interventions that might develop their academic writing, but its misuse could also change students' behaviour in undesirable ways.

Concerns about using technology in educationally problematic ways were thus evident in the data and suggested a need for critical engagement with what technology was to be used and to what end. Alongside educationally problematic uses of technology were also evidence of resistance.

6.3 Academic resistance to technology use

In some cases, there was an institutional requirement that all courses had some kind of online presence via the LMS. In such cases, the EdTech staff had to have some engagement with academics who resisted the use of technology, despite the general data indicating that EdTech staff generally worked with those who voluntarily chose to work with them (as discussed earlier). The data suggests that in a few cases, such academics felt the requirement to engage with the technology, even if only to upload course materials, was an infringement on their 'academic freedom' (SR66Q14, IR003, IR017). This made it challenging for EdTech staff to engage in discussions about implementing EdTechs in pedagogically sound ways. One participant who held a dual role of being an EdTech support staff and a lecturer, indicated that academics should have the freedom to make use of technologies in teaching and learning as they deemed appropriate (SR20Q8) and not as a demand from any institutional structures. If the implementation of technology was dictated, then the implementation might be problematic as it could be undertaken in the most basic way as a matter of compliance, rather than as an opportunity to enhance the quality of teaching and levels of student engagement.

Adopting technology in pedagogically sound ways was seen to take more time and effort than simply learning the basics, so this required a degree of individual agency on the part of the academic:

> Mastering new technologies to the extent that you can use them effectively [in pedagogical ways] is challenging… may discourage or even prevent academics investing their valuable time in developing this expertise (SR7Q18).

Some academics were 'sceptical of people who promise that the solution lies in technology' (IR016). Respondents argued that providing students with access to technology gadgets, infrastructure and WiFi connectivity, electronic content and remote lectures would not in itself solve educational ills (IR019). There was a concern that if technology was presented as a panacea, it would fall short and academics would be frustrated. Njenga and Fourie (2010) have argued that EdTechs are often incorrectly presented as a solution to educational problems with implications for uptake.

Participants indicated some of the reasons why some academics were reluctant to use technology in their courses. For example, it was reported that some academics were concerned that EdTech use 'might encourage [students] missing classes' (IR017) as they would prefer to simply watch the lecture online. Presumably though, if all the benefits of attending the lecture could be obtained from watching it online, then this would be educationally unproblematic. If, however, the face-to-face lecture provided opportunities for discussion or student engagement, which could not be replicated online, then the lecture would remain important.

While the data suggests that the uptake of educational technology emerged from the interplay of multiple mechanisms, the nature of the field of study seemed to have been an enabling mechanism. One participant indicated that a course in ICT, for example, lent itself to extensive use of educational technology.

On the other hand, one EdTech participant indicated that some academics argued that 'No man, sorry, you know in this faculty we don't do those things [EdTechs]. We've got other more important things to do' (IR001). It was noted that in the same institution, some departments used educational technology to a great extent while others were reluctant EdTech users (IR001). While the differences in uptake emerged from a number of mechanisms, as this study showed, one aspect seemed to be the nature of the discipline or field and the kinds of pedagogy associated with it. Some fields were more linked to technology or were more practical than others.

Researchers such as Maton (2013) and Hlengwa (2013) argue that any pedagogical changes need to be implemented with a careful consideration of the specific nature of knowledge. Different disciplines entail different norms, values, literacy practices, kinds of knowledge and types of ideal knowers. Driving changes in higher education need to take this into account. Generic staff training which fails to acknowledge such significant distinctions between fields is unlikely to be found credible by academics (Motshoane & McKenna, 2021).

6.4 Time constraints and workloads

Another frequently mentioned constraint on the uptake of educational technology was the time required to become adept in the relevant program and the heavy workloads that academics bore. Furthermore, a major constraint on EdTech staff engaging with academics in workshops was the availability of time to attend such opportunities, because of:

> … all the requirements that they [lecturers] have on their own time, the research that they have to do and so on … (IR001).

The literature has repeatedly highlighted the issue of time as a constraint to the uptake of educational technology (Mlitwa, 2010; Mihhailova, 2006) and to the possibilities for staff to engage in self-development (Moyo, 2018; Motshoane & McKenna, 2021).

Participants highlighted that academics found it to be administratively difficult to plan and integrate educational technologies in a pedagogical manner. At the same time, they found it challenging to keep up with the ever-changing technology:

> When people realise what they need to put in, to get their online settings working, it is quite tedious… it's time consuming. You may think 'Is this even going to work?' You put in so much effort and then you know things can fall flat. So getting in that extra support might be a way of helping them come on board easier (IR015).

During data analysis, this resistant culture related to time constraints and expertise to learn a new EdTech tool was evident across all institutions. It seemed that academics had cultural preferences on what they were comfortable with and some eliminated the use of EdTechs in their teaching environments. Thus, the status quo of using traditional teaching practices

seemed to be maintained. Most institutions permitted academics to exercise their academic freedom, giving them space by not strongly enforcing the uptake. A situational logic of protection seemed to have emerged, where some academics as individual actors seemed to have remained in their comfort zones, maintaining the status quo of using traditional teaching practices. A relation of complementarities seemed evident for the protection of their comfort spaces. Some academics felt it was necessary that they continued with traditional teaching practices to avoid the issues and baggage that came with the implementation of EdTechs, like time constraints and the challenges of learning new ways of teaching using EdTechs.

Some academics decided as individual agents to take up EdTechs, thus, compromising under limited time and/or unfavourable conditions to benefit students in this digital age. Opportunities afforded by the staff were taken up by individual academics or by whole departments in cases where an individual such as the HOD, as a social actor, were deemed 'EdTech champions' in some of the participating universities. In these events, a personal emergent property was evident for which a situational logic of opportunism was realised. The uptake seemed an intrinsic motivation and generally individually driven.

Regardless of the potential held by educational technologies, some participants did not believe in using them. This was again as a result of the amount of time it required to learn about online tools and to set up online activities. It emerged in the data in most of the institutions that took part in this study, that academics complained that they could not interact online with students because they did not have enough time. Time spent on learning how to use the technologies seemed unavailable for some academics owing to heavy workloads and the burden of having to learn new technology (SR55Q18). These events (time and workloads) emerged throughout the data as structural emergent properties that constrained Ed Tech uptake.

Despite the data about resistance, there was also data about mass uptake of EdTech, particularly the use of an LMS. It emerged that in one comprehensive university 'about 70% of the lecturers have been trained on using the system' (SR65Q18). In another, 95% of staff were indicated to have been trained (IR011). A large number of academics seem to have undergone some form of EdTech workshops. While some lecturers were making use of the

system frequently, many others were still lagging behind. A participant suggested reasons for the restricted use of LMSs:

> The lecturers I have spoken with give several reasons when asked why they are reluctant to use [our LMS] for their courses. [These include that] they already feel overloaded with work, the system (servers and software) often fails, it's difficult to access [our LMS] from home, it takes too long to prepare e-learning materials (SR65Q18).

There was a sense among some participants that some academics would rather focus on their research than on developing their teaching, through the use of EdTech. The efforts spent on the EdTech systems and to learn how to use the different technologies seemed not to be favoured.

Alongside reports of resistance stemming from workload issues was data about resistance stemming from a lack of understanding of EdTech capabilities. For example, some of the constraining factors that seemed to lead to negative uptake were academics that had never participated in online classes. They had never attended online courses (IR003), including the online facilitation workshops that some institutions offered. Thus, they were unsure and 'don't really know what blended/hybrid learning looks like' (IR003).

In contrast to such resistance was evidence of individual academics drawing on the agency to learn about EdTech capabilities:

> I did attend a workshop that was available to gain an introduction/overview to the system, and did a Masters module in online learning to gain an understanding of the purpose and philosophy of an LMS… I am often able to teach myself since I do have a background in Computer Science. I do choose to invest the time as my undergraduate teaching is important to me so I do prioritise activities that promote student learning and that help me develop as a teacher (SR7Q19).

> I, as the lecturer, choose the educational technological tool that I can easily use. I have the responsibility of equipping myself in as far as availing myself to any workshop that can equip me to become the best in that educational technological tool of my choice (SR62Q12).

These excerpts provided some sense of intrinsic motivation where academics as agents were self-motivated to the uptake of EdTechs. This motivation and self-determination seemed to be as a result of agential emergent property of particular individuals. It was notable that some academics as participants in this study were concerned more on the benefits that these EdTech tools would bring to their students' acquisition of knowledge and social skills. As such, some academics were passionate about using EdTechs to enhance student learning. Academic development courses were further valued as enabling the uptake.

While the complaints about heavy workloads constraining the uptake of educational technology was found across institutional types, there were distinct differences in the extent to which there were institutional structures in place to encourage the use of EdTech.

6.5 Institutional support for EdTech

As discussed thus far, data revealed that potential users of EdTech were often driven by their own values and beliefs to experiment with various pedagogical approaches using technology (SB7Q19, SR62Q25). In this case, the agential conditioning of their 'personal projects' (Archer 1996) in terms of the desire and passion for teaching played a vital role to enable the uptake of EdTech. However, critical realism cautions as against simple causal accounts because phenomena emerged from the interplay of multiple mechanisms. It is important to understand that alongside mechanisms such as the personal projects of particular academics were the enablements or constraints of institutional structures. Such structures included the existence, or lack thereof, of EdTech units but also extended to other resources such as supportive policies that valued the use of technology for education:

> [They] have the teaching and learning philosophy of which other institutions they call it teaching and learning principles. So, our teaching and learning philosophy at [our institution] is 'learning to be' – and in order for students to learn to be, one of the platforms that are recommended is the use of technologies (IR005).

It was evident that institution level support, such as institution level policy calling for the use of technology had an enormously enabling effect on the success of the EdTech units to work with academics. It should be noted that where the policies provided an enabling culture for

experimenting with technology to enhance teaching and learning, there were generally EdTech staff appointed through the central budget in permanent academic posts.

Technology has changed how all organisations function and offers specific affordances for education. For example, Shabha (2000) argues that technology should be regarded as 'a catalyst to combat the barrier of inflexible organisational structures', and Padayachee et al. (2015) note that institutional culture is a fundamental aspect for the establishment of online learning in an institution.

The literature indicates that e-learning policies at an institutional level are a necessary mechanism to integrate EdTech into teaching and learning (Czerniewicz & Brown, 2009; White, 2007). In addition, success in positive EdTech uptake by academics is often enabled by guiding institutional policy, and UNESCO (2012) suggests that direction from leadership is needed to drive the integration of EdTech. Czerniewicz and Brown (2009) further highlight the connection between policy and practice.

Some participants mentioned reference to the use of EdTech in the institution's teaching and learning philosophy or strategy. For example, in seven universities where this mechanism emerged, one comprehensive (IR018), two universities of technology (IR010, IR021) and four traditional (IR004, IR009, IR014, IR017), participants highlighted that strategic documents in their institutions referred directly to the use of technology to enhance teaching and learning:

> … the use of technology to enhance teaching is part of the institutional strategic plan and the teaching and learning policy (SR42Q14).

In contrast to this, others suggested a lack of system level support for the use of EdTech:

> … lack of drive through policy and management (SR51Q18).
>
> Educational technology is not included in their KPAs [key performance indicators] (SR28Q18).

The response by SR28Q18 regarding KPAs was significant because Archer (2014:122) has argued that performance indicators are 'generic bureaucratic expressions of the situational logic of competition' and suggests that they often have unintended consequences. In this case, it can be seen that academics were conditioned to only value those activities presented as KPAs. The lack of reference to EdTech in such KPAs, therefore, constrained its uptake. The

cultural conditions that allowed KPAs to be part of the institutional structure might result in academics competing for recognition and ignoring activities that were not explicitly recognised and incentivised in such KPAs. In another institution, educational technology *was* referred to in the KPAs, and this was seen as an enabler:

> Promotion of academic excellence in undergraduate and postgraduate studies and one of the Key Performance Areas (KPAs) under this goal is Learning and Teaching with Technology. This KPA necessitates that 80% of students and staff should participate in appropriate teaching and learning with technology by 2019 (SR65Q14).

Data revealed that several universities endorsed optimal use of EdTechs in their institutional documents (SR61Q21). Some institutions embraced the attachment of reward systems (including academic recognition) for innovative teaching with educational technologies (IR004). Participants called for such system-wide strategies to reward academics for their contribution to impart knowledge using EdTechs (IR009, SR75Q14):

> We need to develop institutional guidelines and/or policy in relation to ICTs in teaching and learning (SR20Q5).

While change management strategies seemed essential (SR20Q19), again the 'development of empathetic approach to academic staff development that is informed by appreciation of context' (SR20Q19) seemed vital. From the data, this change management seemed to monitor that academic staff development focused on teaching and learning principles and increased agency to use EdTechs, rather than the technology itself.

Even if the policies did not explicitly call for the use of technology, there was a view that where an institution had policies and strategies that focused on issues of quality in 'instructional design, pedagogy, assessment, formative assessment and so on' (IR016), then there was a desire to constantly improve teaching, including through the use of technology. In institutions with a strong academic development centre and an active teaching and learning committee, there was a greater focus on quality teaching and learning generally, and this included the use of technology for education. Where teaching and learning was identified as a valuable activity within the university (such as through promotion criteria, best practice awards and so on), then this enabled the use of technology for education.

Participants argued that the deans, HODs or those in management roles were at the deciding table by either motivating the staff to integrate EdTech or not (IR010). A number of participants noted the role played by management in the uptake of technology:

> It is part of the blended or so-called hybrid model of teaching that management supports (SR45Q14).
>
> This is fairly diverse, depends on Faculty and how HODs and champions in departments are driving it (SR34Q8).
>
> Opportunities for personal engagement focused on the integration of digital technologies into the curriculum are offered to the academics in the Faculties of Health Sciences and Accounting and Informatics. Meetings are held with HODs and deans to ensure support and also sharing of progress and setbacks (SR39Q23).
>
> We work with those who are interested or those whom their HODs encourage them to use educational technology (SR28Q19).

It was, therefore, evident that the support or lack thereof from management was a significant driver of ensuring that 'staff members are keen to try out new things that improve their work' (SR42Q20). The support of management for EdTech enabled its uptake (SR55Q20).

There was also reference to the national White Paper on e-Education in South Africa (DoE, 2004) in the data, as a mechanism enabling the uptake of educational technology (SR64Q5, SR7Q19, SR7Q241, SR38Q23, SR39Q14). It was argued that the call, by the Ministry, for higher education to include using technology both to enhance the curriculum and to ensure that students acquired the necessary technological literacy acted as a lever for EdTech staff to drive the uptake of educational technology in their institutions.

Alongside reference to the role played by national and institutional policy as enabling EdTech, was reference to policies and strategies developed within the EdTech units. Some of the EdTech units had detailed descriptions of their institutional role in their strategic plans or had other document outlining the support they offered for the uptake of educational technologies for teaching and learning. Such documentation was regarded as a way to address the need for improvement of higher education and to encourage pedagogically sound and efficient use of

EdTechs. These strategies provided a detailed overview and guidelines that signified roles of these units and the amount of support that was expected to be given to academics.

These strategies as structural mechanisms, such as, institutional support, strategic plan and documents addressing EdTech support, were seen to address the issues impacting on EdTechs uptake and were regarded as a way to respond to the improvement of higher education and to encourage efficiency in every aspect of the EdTech systems usage. Where the institution as a whole noted the increasing importance of technology in higher education, through strategic documents, institutional development plans, promotion policies and the like, they also had clearly defined EdTech units (often positioned within academic development centres). There was thus a complementarity between the institutional culture (expressed within policies) of recognising technology as being an important aspect of higher education practice on the one hand, and the institutional structures in the form of EdTech units and the staffing thereof, on the other.

6.6 Technology use during student protests

In 2015 and 2016, the #FeesMustFall (#FMF) protests shut down the South African higher education institutions on a sporadic basis. During the #FMF, university students across the country protested about the high cost and increasing university fees, alongside other complaints such as institutional racism and the colonial nature of the curriculum. From the data, it was identified that this protest had major constraints on face-to-face teaching in universities. Almost all students in HEIs were affected, but the most affected students were those in their final year of study who had already secured employment with their future employers. Data revealed that educational technologies, especially LMSs, were suddenly a convenient structure to pursue teaching and learning under those stressful examination conditions.

The findings revealed that this campaign had a huge impact in changing minds of academics at some universities. Many participants from the EdTech units noted that they experienced the escalated technology uptake across the higher education institutions (IR007, IR010, IR021, SR23Q26, SR62Q20):

> The adoption is increasing, especially after the 2016 student protests (SR73Q25).

The #FMF demonstrations pushed more academics to online strategies as a means of getting information communicated to students. While in some universities there was a history of EdTech implementation, it was identified that the #FeesMustFall protest had put much more emphasis on how EdTechs were being used as an integral part of teaching and learning. Some universities already had everything in place for online education, for example, EdTech units and the use of EdTechs. For other universities, this was not the case, they were caught off-guard and suddenly many resistant academics had to change their views about EdTechs.

Participants confirmed that the #FMF campaign was seen as an event that brought about a major growth in the uptake of EdTech. Some mentioned that this was a good outcome from the #FMF protests (IR021) and indicated that:

> … maybe it was for a good cause in a way, the strikes [student protest] (IR017).

The use of online learning during the protests was not uniformly supported. Many argued that academics should be supporting the protesters rather than continuing to teach. They felt that going online was undermining protesters' attempts to get a response from the minister and the various VCs to calls for fee free higher education. Others also argued that moving higher education online in the face of campus shutdowns was unfair because many students did not have the hardware or data needed for online learning.

In much of the data, however, it was clear that institutions with EdTech capacity drew on this to continue teaching even where not all academics approved of such actions:

> We've also driven e-Assessment as a strategic focus area and during the Fees Must Fall last year [2016], it moved to higher levels as it forced people to go online with their testing and examinations. Without collaborative efforts between the Blended Learning team, academics and support staff that would not have been possible, (IR021).

Participants highlighted that some academics managed to deliver lectures through narrated PowerPoints and other online conferencing tools, for example, Blackboard Collaborate. Data revealed that the challenges grew much bigger as internet data and connectivity issues emerged. But the constraints of data and hardware was noted as meaning that some students who were not protestors and who wanted to continue with classes were not able to do so.

However, it emerged that some academics 'held bootcamps in churches and public venues to accommodate the students who did not have access and there were lecturers who posted [on the LMS], that those [students] who don't have access, come and get a CD with all the content on or a memory stick, come copy the data' (IR007).

For this reason, assessments were generally not undertaken during this time, but some students were able to access materials online and keep up with their studies while others were not:

> Yes, the lecturers definitely did use BlackBoard [LMS] more than previously (IR007).

> Pre-#feesmustfall the initiative was entirely voluntary and non-prescriptive, post the [#FeesMustFall] institution is strategically leveraging the use across the board (SR69Q8).

There was a concern that while the protests had led to a rapid increase in EdTech use, this uptake was reactive rather than proactive. The uptake during this time was thus not entirely welcomed because there was a view that rushing to put classes online might undermine attempts to get academics to use EdTech in pedagogically sound ways:

> They will only seek assistance when facing outside pressure (IR004).

> Some academics started to take short cuts by dumping notes, videos and other resources into the LMS (IR003).

The situation seemed opportunistic as academics might not have applied scholarly practices in their EdTechs use owing to the outside pressure. There was a sense that recorded lectures and note materials were simply being placed online without any kind of mediation. Some participants saw a few academics as giving the message:

> Just go access the lecture there [on the LMS] and I will still test that stuff (IR001).

The extent to which #FMF pushed the uptake of EdTech was notable and possibly a significant 'trial run' for responses to the COVID-19 pandemic:

> And now you're even seeing this more and more when lecturers are preparing for if something like this should happen again… So, that classes can continue, the academic

> year can continue even while they're not on campus or the students get to contact sessions. So, we found that there are more and more lecturers wanting to go online and seeing if we can help (IR015).
>
> It is growing exponentially in the wake of #FMF (SR69Q25)
>
> Last year [2016], fees must fall pushed every lecturer to strategies on the means of getting the information communicated to students (SR62Q20).
>
> Recent [2016] student protests dramatically increased uptake. Success was moderate at best, though, because many students lacked internet access (SR51Q25).
>
> A lot of exams took place because students couldn't come to the university or sit down and the exams couldn't continue on campus. So, we did have sit down exams off campus but then some lecturers had online exams as well. So, the use of our Learning Management System definitely sky-rocketed during that period [of #FMF]. We had thousands of students going online getting materials, writing tests, writing exams online. So, we found ourselves more busy during that period when the university was shut down basically, couldn't come to campus but then they went online (IR015).
>
> One other thing that really helped us is the Fees Must Fall Campaign. Then they [academics] realised that they [academics] really need us… the DVC even issued a notice that please use [the LMS] and we were all like, wow the DVC knows [the LMS], it helped [in the increased uptake] (IR010).
>
> It is during such turbulent times of students' protest that those academics who did not support the use of the LMS now do, as they have to support those students who want to complete their academic year (SR23Q26).

One participant from a traditional university highlighted that during the #FMF campaign, 'I spoke to many lecturers who were disappointed that the students didn't make use of the resources that were online and that so few of the students took all the tests that they were supposed to' (IR007).

In digging deeper to analyse if the situation enabled or constrained, it was identified that in some institutions, the online learning [LMS use] during the #FMF was not embraced by all

students. A limited number of students managed to access the online content, while others 'did all little interesting memes saying things like, you know, *"If I wanted to do my stuff online, I would have just gone to [this institution that offered more of online learning, institution name deleted]"' (*IR003). Thus, this indicated that there was somewhat a value from both students and academics on the face-to-face lecture experience. The sudden supplement/replacement of physical teaching and learning was rejected.

It was evident that in the #FMF campaign as a social context, some academics felt it was appropriate to remedy the situation by accepting EdTechs as a temporary solution. This also seemed to have prepared them to be proactive for similar future events. #FMF was a stimulus that academics felt they needed to implement EdTechs. As a result, a culture that embraced the EdTech support units had emerged.

6.7 Conclusion

In this chapter, I considered the ways in which EdTech was seen by academics and EdTech staff to be a valued means of enhancing the quality of education. In such cases, the technology was used to make epistemological access more possible by making clear to students how processes work or what was expected of them. It was also seen to enhance student engagement. In contrast to this, I then explored the data about concerns that the technology was being used as a 'dumping ground' or in instrumentalist ways. There was evidence that where academics were forced to use technology (typically in the form of LMSs), resulting in some academics doing so in ways that were not pedagogically sound. The uptake of educational technology in pedagogically sound ways seemed to have emerged, at least in part, from the agency of the individual academic. The nature of the discipline or field was also seen to play a role in the extent of technology use.

The chapter also considered mechanisms enabling EdTech uptake that were at an advanced level. I discussed the extent to which the use of technology was valued in institutional documents and the structures that played an enabling role. National policy was also referred to by the study participants as playing an enabling role.

The chapter concluded by considering how technology uptake was affected in complex ways during the 2015 and 2016 protests, which acted as a kind of foreteller of the 2020 COVID-19 pandemic experience. In Chapter 7, the final findings chapter, I consider the data related to

the nature of students in South African higher education and the extent to which technology is a fundamental part of all social structures in the twenty-first century.

Chapter 7 – Students in the 21st century

7.1 Introduction

In Chapters 5 and 6, I discussed the data related to EdTech staff and their work with academics. I identified several mechanisms conditioning the uptake of educational technology by academics across South African universities. One mechanism that emerged across the data was the different understandings of the use of technology, namely, whether the integration of technology for education was simply about the acquisition of technical skills or whether its use needed to be considered from a pedagogical perspective.

In this chapter, I consider the data related specifically to how the participants framed students' use of technology. Many students were actively engaged with technology, through access to social-networking sites and by using numerous social media tools, such as YouTube, WhatsApp, Facebook, Twitter and Instagram as well as sites with educational agendas such as blogs, Wikis and Slideshare, for example (Sclater, 2008). Integrating these into the curriculum can offer great learning opportunities and there is significant literature suggesting that this has transformed the ways in which research happens (such as Saadatmand & Kumpulainen, 2012; Bozalek, Ng'ambi, Wood, Herrington, Hardman & Amory, 2014). Much of the reference in the data was similarly in support of the benefits that technology could bring to students and how technology was becoming crucial for quality education.

7.2 Benefits of EdTech for student learning

7.2.1 Student engagement and interaction

A number of respondents indicated that EdTech had the potential to improve the quality and accessibility of higher education for students (IR008, IR012, IR017, IR023), and even that the use of EdTech 'has improved student's performance in some courses' (SR28Q20).

While the literature suggests concerns that the use of EdTech might reduce levels of student interaction (Njenga & Fourie, 2010; Kemp & Grieve, 2014), the data was replete with examples of academics claiming that the use of EdTech had actually increased student engagement and interaction:

> … the different life experiences of diverse students to formulate meaning in context (IR004).

> Technology can make a difference by enhancing the learning experience of students because technology allows for engagement in class (IR014).

> This way they feel secure and free to interrogate one another in a safe space (IR008).

Some respondents suggested that students were less intimidated to engage online than they might be in the physical class:

> [This is] because when you are in class, that's where issues of race come out. Issues of gender, issues of age and whatever. But online there is nobody who is doing that. So, in that point, technology is actually an enabler, a very good enabler (IR008).

As previously indicated, there was data about different tools afforded by the LMSs to promote reflective thinking, for example, discussion forums, wikis and blogs (IR004, SR8Q24). It was, thus, suggested by some participants that technology encouraged rather than discouraged engagement with materials and communication between students:

> Student knowledge can be expanded by using online resources such external tutors, lecturers as videos, journal articles, databases and MOOCs to augment what they learn in class. Discussion forums with other students doing the same programme worldwide (SR42Q24).

> The main important thing is that it can enhance learning because you can have so many different learning experiences that you can give the student (IR014).

> Some lecturers ask their students to create audio recordings, interviews where they sit with the patients in the field. That's another way of assessing. Also, they've asked students to create digital stories and basically, showcasing the report in digital forms. Ways of assessing are definitely also changing (IR015).

Allowing students to engage with the course content while sharing or posting their views in an online class was seen to promote social and communication skills. Students were given a platform, a space to talk that 'provides a very critical thinking space' (IR008). Though it was

also identified as important to actively design activities to enable student to engage with each other:

> Designing activities that would allow students to engage with others using technology... that I guess when you learn social skills (IR022).

Some respondents spoke in detail about the ability of these EdTechs to enhance learning and nurture critical thinking skills in students, for example, IR020 suggested that technology could be used to expose students to more perspectives than might be possible from only face-to-face lectures and tutorials:

> How will my students engage in the disruption of knowledge? So, the only means is when they have different access of getting knowledge (IR020).

There was thus evidence from the data that EdTechs, in a form of an LMS, could, *if well-designed*, enable student-directed learning:

> it provides for also different learning styles and it covers a variety of students. So, a whole lot of students are able to relate to the different tools that can be used to enhance the quality of teaching and learning. The fact that you are able to use audio tools, visual, means the students can learn anytime and anywhere (IR018).

> … intensive activities and services that are accelerated by the availability of technical and scientific advances driven by various technologies (SR49Q26).

The use of a variety of EdTech tools offered opportunities for open dialogue between students in the construction of knowledge, for example, when online discussion tools were enabled (IR014, IR016). This implied that activities that were posted using online technologies should be thought-provoking to encourage students to engage in some form of research while participating in those activities:

> … develop engaging learning resources that at all times it should be used to foster constructivist engagement drawing on the different life experiences of diverse students (IR004)

> if you want students to learn social skills, then adding communication tools in an online course is essential (SR41Q24).

It was evident that many respondents saw technology as significant in assisting students to develop communication skills as well as collaboration and leadership skills, and some made the link that these kinds of skills would be required in their future work environments.

In addition, the uptake of EdTech was often explicitly reported in terms of the educational benefits for students, such as the possibilities of including authentic learning materials, such as pertinent videos and interactive tasks, so that:

> … students are made aware of real-life experiences (IR005).

In much of the data, it was clear that academics believed that EdTech, when carefully used, had the potential to offer new and different ways to develop student agency, but this depended on how they were designed and implemented"

> It really gives them a better critical learning experience (IR014).

Participant IR003 used an example of how a critical learning experience could be created to describe this:

> So, for example, I was at this convention and there was an architecture lecturer using voice threads, getting [indistinct] students and on phones and such and she'd like annotate drawings and talk through them and students would actually send her little voice threads back and gave in a project in that way. So, that was [an] interesting example that I think any course where there is like a studio-based pedagogy and there's that kind of a collaboration and feedback happening around a project that might be a good tool (IR003).

7.2.2 Self-directed and self-paced learning

There was frequent mention of the ability that technology provided for students to work at their own pace and revisit difficult materials, for example:

> … adapts to the student's learning experience and doesn't waste their time repeating work that they've already done … focus on the work that they struggle with. It really gives them a better learning experience (IR014).

EdTechs were seen as valuable for students, owing to its affordance for anytime, anywhere accessibility (IR017, IR018, SR22Q24 and SR65Q20):

> …. self-regulated learning, flipped classrooms, adaptive learning, more authentic assessments etc. (IR014).

> Ease the work load for academics while maintaining the quality, for students to learn in a very interesting and engaging way, for students to learn at their own convenient time (SR55Q24).

There were also views that online learning allowed for more student agency as the learning could include aspects that were self-regulated. Students could engage with materials as often as they needed to and determine for themselves what their learning needs were. But as the following participant reflected, simply putting activities online was insufficient to ensure critical self-engagement. There was also a need to reflect on the teaching and learning and ask questions, for example:

> How do you engage in discussions online? Who participates? Who doesn't? Who is silenced? What are students' fears? How can one create a space that feels safe? (IR022).

Authors such as Kakasevski, Mihajlov, Arsenovski and Chungurski (2008) as well as Padayachee et al. (2015) argue that it is the teaching approach rather than the technology that most influences a student's ability to learn. So, the extent to which academics engaged with technology from a pedagogical perspective no doubt had a bearing on the extent of benefit for students and, in particular, the extent to which it fostered student agency.

It appeared that providing students with a variety of online information and activities enabled students to develop holistically. Respondents in the data mentioned that using these EdTechs for students enabled the development of graduate attributes (SR35Q24) and prepared students for the world of work (SR28Q24, SR45Q24) as the critical cross-field outcomes could be anchored and promoted through a variety of online activities:

> … creating opportunities for students to be critical thinkers in using the various tools offered by some LMSs as a multi-modal learning (SR61Q26),

The literature also indicated that it is important that online spaces be specifically designed towards student engagement and agency:

> The International Society for Technology in Education (ISTE) has created ISTE Standards for Educators to develop digital learning pathways that empower students to be part of the learning process. It is now imperative for higher education entities to share authentic ways to develop self-directed and involved learners within our curricula to support digital literacies (Adams, Becker, Cummins, Davis, Freeman, Hall Giesinger, Ananthanarayanan, …& Wolfson, 2017:5). The future is online in a knowledge economy.

7.2.3 Preparing students for the workplace

In addition, the data focused on the benefits of EdTech uptake for students. This included data about the inevitability of technology in current and future higher education given the technological nature of the modern world. For many respondents, there was a sense that academics needed to come to terms with EdTech so that they could use it in meaningful ways, given that technology was everywhere, and that resisting technology as being unnecessary for quality education was being out of touch. There was a strong belief that if academics did not embrace it, then they would forever lag behind:

> We are in the 21st century whether we like it or not... And whether we like it or not, we are bound to [use educational technologies], the sooner the better (IR008).

> The way of the future is online (IR012).

There was reference to the ubiquity of technology in the world and the need for students to have technology skills for the workplace. The use of EdTechs in their courses was one way of preparing the students for this (IR004, IR005). Participants indicated an increasing demand from employers expecting graduates to be technologically ready to fit into employment opportunities. As noted by Adams Becker et al. (2017:6), 'we are witnessing a shift in employment needs as the job market evolves to meet the growing technology demands in society'. The work-related skills may vary for different industries but technology skills were seen to be essential for preparing the next generation of employees regardless of their field.

There was also some indication that the technology could allow students to experience the identity entailed in their professions:

> As they are doing, we believe that when they complete their studies, they should be what they were learning. If it's a lawyer, at the end they should be having experience to be a lawyer (IR005).

There was a view that students needed to be able to access more information, much quicker than in the past, and they needed to make critical decisions on validity (IR021), which meant that using technology in their studies was key to preparing them for the world of work. This view suggested that equipping students with the skills of the 21st century put them in a position to be employable as most fields of work demand high levels of computer and technical skills. Universities were seen to bear a responsibility to equip students with globally competitive skills (IR008, IR014). Furthermore, there was the added benefit that EdTechs implemented with approaches such as authentic learning (see Chapter 5), could 'bring students into meaningful contact with the future employers, customers, clients, and colleagues who will have the greatest stake in their success' (Lombardi & Oblinger, 2007:2). The need for students to become digitally equipped was supported by SP34Q24:

> Communication is key… modelling good EdTech practices is part of blended [learning]. We encourage students to become digital scholars as this is an important part of becoming.

Technology has become increasingly widespread and penetrated both the workplace and higher education (Adams Becker, et al. 2017; Njenga & Fourie, 2010), and the study data suggested that alignment of higher education to workplace practices was an important issue driving EdTech uptake:

> As an academic person, my platform demands me to be a real researcher and also that belief or that character must be cascaded to the students because since we are at the higher learning institution here, we are not expected to spoon-feed the students, but we're expected to expose them to the knowledge economy. So, the only means of exposing the students to the knowledge economy is via the e-learning method (IR020).

Technology was understood to be used as a tool to help students in understanding study content as well as a tool to prepare students for online and social media skills and the ubiquitous use of technology in the workplace. The use of educational technology was thus valued as being key to the employment prospects of graduates (IR015). When technology was not used in a course or programme, some EdTech respondents suggested that this would be a major disadvantage when the graduates were faced with the work environment:

> Giving your students skills in terms of, you know, e-skills because when they go out, you don't want them to just have theory because skills, they should be able to apply it in the workplace (IR015).

> We have lecturers who will start using specific technologies because they know students are going to encounter those in the work place, for example, Collaborate [a web conferencing software] (IR001).

Web conferencing software and a few other programs were tools that academics specifically used because in that particular field of work, students would need to be adept in using these. This practice enabled students to gain exposure to such tools during their interaction with their lecturers and peers. Some activities were expanded by inviting external experts in the field to present online webinars or seminars as guests (IR001). Company or business representatives were also invited to present on a particular topic, for example, to describe the types of students needed in their labour market (IR001). Students' social and facilitation skills were thus enabled through these communication technologies. Students also collaborated in groups to run the sessions (IR001), thus, promoting and developing their social skills.

The need to integrate technology into education was vital to prepare students for the current world, and was extensive in the data. Section 7.3 discusses the benefits of EdTech for students, especially as students were demanding that technology be used in their courses.

7.3 21st Century students' demand EdTech use

There was significant data suggesting that students in the 21st century engaged with technology as part of their daily lives:

> Our learners, our students use technology all the time so and they are digital natives, (IR002).

> When you look at the current generation, our children you know, their interest is different now. They've got other things that they want. They have got other means of learning that they also want to explore, which is more interactive. Students can share ideas, they can engage and also, it enables for immediate feedback as well. For example, I'm looking at a tool like your WhatsApp or your Facebook, something can be sent online learning and the lecturer is able to provide feedback and not only the lecturer, but other students can also share their views. So, it allows for that, and I think by that I mean it allows for collaborative as well you know, they share ideas online learning (IR018).

Furthermore, some participants indicated that students spent most of their time playing around with technology:

> EdTechs are probably the best thing students need to enhance their interest in education, uploading educational games for a module might increase students' interest in that module and encouraging blogging in a module about specific topics of interest (SR38Q24).

This frequent use of technology by students was seen to be account for the reports of students demanding greater infusion of technology into their courses:

> I mean there was definitely an increase in demand [by students] (IR024).

> So, lecturers are being forced by students to move towards the technology (IR017).

> Some students often became really grumpy…. 'You're still, like, using an overhead projector?' and 'Why isn't he using PowerPoint and why hasn't he set up a [LMS] course?' (IR024).

Students are generally active users of educational technologies (Kakasevski et al., 2008; Padayachee et al., 2015) and engage frequently with technologies in their day-to-day lives. Between TikTok, Facebook, WhatsApp, Instagram and Twitter, almost every young person has some kind of online profile (Kilfoil, 2015). Research conducted by Czerniewicz and Brown

(2005) reported that students are actively involved in the use of educational technologies and often do so with little guidance from the lecturer. The increased student use of online learning will result in the growth of new approaches which will be helpful to accommodate students from the low socio-economic background (Ng'ambi, Brown, Bozalek, Gachago, & Wood, 2016). Research has indicated that several HEIs have issued students with laptops (Kilfoil, 2015), while in some, it was mandatory to have a device to be able to access online learning activities (IR016). The ECAR report (2016) revealed that there is a growth of student ownership of digital devices with students using these gadgets widely and seeing them as essential to their success in learning. It was also noted that not all students who entered the universities had EdTech skills to use these devices, thus, additional support was offered through basic computer literacy skills (Kilfoil, 2015).

Many of the respondents indicated that the nature of the student body, and their engagement with technology outside of the university, was a key enablement in the uptake of educational technology:

> The sooner we make sure that our institutions are fully run using technology. We learn using technology and lecturers include technology, different technologies into their pedagogy. Then it makes learning much easier for the new generation, which we mostly deal with now (IR002).

> We are living in the time of the 21st century where the youth of today and our students specifically are using technologies as part of their life. And we can't say we don't want to use technologies for teaching and learning because then we are depriving them their way of life (IR005).

The 'millennial generation' of students were noted in the data as significant drivers to the uptake of EdTechs (SR1Q20). The millennial generation is described by Doyle (2013) as the first generation of students to have access to information communication technologies from the day they were born. As a result, the use of technology in HEIs is supported by the study:

> The use of technology in higher education is very essential whether we like it or not. We are living in this era of technology where any child from childhood up to throughout their life span, they are using technology. And hence, it is very important

> to infuse in our curriculum throughout … given the fact that as universities we are in a very good position to do that … these are the born-free students[10] who were just from an early age, they were into computer stories, the technology stories. So as far as technology is concerned for them, it's one of the social skills which they acquire it, not only from me as an academic or from an academic institution or higher education. They acquired it as early as early learning (IR008).

As one participant noted, students accessed information on their phones on a continuous basis, and so even if academics do not use technology, their students would be sitting in their classes using it:

> … which involves multitasking every time, students like using their devices to access information (SR62Q24).

There appeared to be a growing awareness of students' expectations to use social media to access information and of their almost constant engagement with it:

> I think that our students are just so capable in terms of social media that academics find themselves relying more and more on social media to be able to say, 'For me to be able to communicate with my students I've got to become familiar with this' (IR011).

Some study participants reflected that the students understood various platforms and online etiquette better than the academics, for example, 'simple things like typing in capitals is shouting' (IR005). The literature notes that a major advantage of EdTechs included an 'increased equity of access' (Dhanda, 2015: 48), thus, it is believed that student would use their devices to access the online learning content according to their needs. Students were able to easily access information and to discuss with each other what needed to be done in their courses.

The pressure from students on academics to include the use of technology in their courses took various forms. Participants indicated that many academics experienced a direct push from students on the use of EdTech in their courses:

[10] The 'born free' generation refers to those born after the first democratic election in 1994.

> [Some academics] came to [an Edtech training] workshop because the students pushed them to come to the workshops, which means except for them, they wouldn't even come (IR005).

One participant indicated that a lecturer attended an EdTech workshop and said, 'students are always complaining because I'm not so good with [the LMS] thing' (IR001). Pressure from students also took the form of comments about technology in student evaluations of teaching:

> So, I think there's pressure from students, we have a good culture of evaluation so students do have an opportunity to give feedback, so, if students are pressurising them [academics], I think that also can increase the uptake (IR024).

Thus, from this data, it was notable that there was some pressure created through the agency of students. Some lecturers appeared to accept these demands by starting to use a variety of EdTechs. In many ways, students were also 'forcing' their lecturers to use technology to make course administration easier as they expected to be able to access materials, upload assignments and check marks from anywhere and at any time (SR23Q20, SR19Q20). But while 'the students are the ones pushing the academics to use technologies in their teaching' (SR23Q20), in some cases, these student demands resulted in further resistance from the academics. Given the challenges that EdTech staff noted in working with academics who were not particularly keen on using technology (as discussed in Chapter 5), this bottom-up drive could lead to academics engaging with technology from a position of some resistance:

> They are pushed by students, but they don't want to, but ja, they don't really have a choice (IR001).

The demand by students for technology use in their courses was at times seen to be pedagogically unsound. There was data to suggest that at times, students demanded the use of educational technology, especially recorded lectures and access to lecture notes, from an understanding of learning as transmission of knowledge, rather than as a process of epistemological access:

> Motivation from the students does not necessarily correlate with sound educational principles; they want the notes uploaded so they don't have to take notes in lectures (IR004).

According to some participants, students were focused more on receiving content rather than attaining knowledge and technology was thus understood by some students to be a repository. The differences in academics' understanding of educational technology, discussed in Chapter 6, was thus echoed in reports about the differences in understandings of students:

> Students are very into content, 'Where is the PowerPoint?', 'What must I learn?' (IR021).

The 'bottom-up pressure from students' (IR004) seemed to have different effects on different academics; for some it was the drive to connect with EdTech staff and experiment with technology in their courses, and for others it was seen as students not understanding what approach to teaching and learning was appropriate.

While much of the data indicated that students were technologically adept and demanded that academics used technology to enhance the quality of teaching and learning, there was also data that showed that some students battled with the use of educational technology, as is discussed in Section 7.4.

7.4 Students struggling with technology

As indicated in Chapter 5, most EdTech staff worked with academics to assist them in using technology in their courses, but in a few cases, they also provided workshops and supported students directly. These student workshops were generally focused on orientation to the LMS (and demonstrations of how to upload assessments and so on), but, in some cases, they were also about basic computer literacy. Despite the comments about the ubiquitous use of technology by 'millennial students' who were 'digital natives', there was also data suggesting that some students were in fact not very familiar with technology:

> Sometimes students will not perform well because – not because they don't know the content, but because the technology that is used for them to access content is not familiar (IR006).

> They [students] are not equipped enough, what I have normally done especially with my first years, I used to take one lecture and fully dedicated to teaching them on how to [use the LMS] … just those introductory notes it helps them a lot. And to go further,

> I used to arrange the ICT people to have the training in different group sessions, (IR020).

> But the problem now is I'm teaching those who were previously disadvantaged; that is my challenge (IR008).

Participant IR008 addresses the issue of the digital divide in South Africa, where some students own smart phones, have Wi-Fi at home and use computers at school, while others have none of these. The higher education institutions expanded student access to computer laboratories to overcome the concerns about digital divide (Ng'ambi et al.,2016), but inequality in access to the online learning environment has continued to constrain students from marginalised groups (Czerniewicz & Brown, 2009). In South Africa, there were a number of initiatives to optimise access so as to bridge the digital divides given the inequalities in socio-economic status (Kilfoil, 2015), but the data suggests the divides remained a problem.

Respondents highlighted the benefits of having students who were already technologically inclined and tied this to the development of knowledgeable citizens (IR002). However, they also indicated that they could not assume that students would have computers and other technological capabilities. On the other hand, there was also data suggesting that it was not a major problem if students did not have computer literacy and other technological capabilities with them, because:

> I have found that students who have not had access to technologies before entering university pick it up very quickly and have no hesitation in asking for assistance from peers (IR004).

7.5 Connectivity issues

Alongside concerns that not all students had technological skills was some data about uneven access to hardware and data. This was only seen to be a problem when students were off campus as all universities had Wi-Fi, although the spread and speed of connectivity varied greatly between universities. In some cases, there was unlimited Wi-Fi available in every campus venue whereas in others, this was only available in the computer laboratories and

library, and there were complaints about the internet speed. A participant from one historically black university indicated that:

> … we have internet but sometimes it's very slow and you don't know where the problem is because if you ask – we have a technology department. They are assigned to the infrastructure and then we have the ICT but then if you experience a problem, when you go to this department they will tell you, 'No, it's faculty, it's ICT' (IR010).

Additionally, in several universities, it was identified that 'ICT department is rolling out Wi-Fi to enhance accessibility' (SR65Q20) and that Wi-Fi access was being increased (SR51Q20) but in the meantime there was 'poor internet connectivity' (SR55Q18), and 'inadequate internet access, especially for students' (SR38Q18).

One participant reported on some research they were doing 'on the use of technologies, trying to find out how academics are using the technology for teaching and learning' (IR005), which found that at their institution, 'everywhere where students are, now they can connect' (IR005), and that there were no problems with the infrastructure and with connectivity on campus, though internet access had been somewhat sporadic in previous years. Similarly, another participant from an HBU indicated that:

> Infrastructure and connectivity - at our institution this is pretty much in place. A working LMS, student LAN facilities open 24/7, Wi-Fi connectivity throughout including residences and encouragement to students to bring their own devices. All of these are imperatives and we are fortunate in that all of them are in place, including to remote sites like rural medical facilities where our students have to do practical work (IR004).

It was evident in the data that the facilities differed across institutions. Because many students only had access to computers and the internet when they were on campus, it meant they had to travel to campus on weekends or stay after classes to do their work. This was a problem for some students as 'they travel long distances to school [university]' (IR017).

Data and connectivity issues caused some students to complain about the large file sizes used in online modes (IR021). It appeared that a system synchronisation of student activities was available in some institutions to support students who struggled with data/connectivity:

> If they are not on campus, they don't necessarily have access to the server or they don't have data on their phones and things like that. So that is very important, and it has an impact on how we design. For example, prepare small file for online resources which could easily be downloaded. Moodle has a fantastic application, which allows for working offline and then when you come onto campus, we have Wi-Fi all over the campus, synchronise with the online Moodle server (IR021).

Beyond this specific data, however, there was no reference to designing courses specifically for limited internet access or slow internet speeds. The focus of all discussion on EdTech design was on enabling student engagement and allowing for students to work at their own pace. There was no other reference in the data to the need to design for the complexities of limited data and constraints of hardware. Indeed, the issue of connectivity was not seen to be an issue with which all academics were sympathetic:

> There is one lecturer, you know, she doesn't want to know whether you have internet or whatever. Everything is online and believe me, students do their work. So, we realised that in most cases we try to – we are the ones who give the students reasons that 'Ja, we don't have this, we don't have this'. But then, well, I know in some cases or in some universities students do complain about that, but we never experienced complaints (IR010).

As the data quote suggests, the extent to which the student body had access to hardware, software and internet connection varied greatly by university. In cases where the student body had very few Quintiles 1 and 2[11] or NSFAS[12] students, both of which could be used as proxies for financial status of students, then the student body would be more likely to fall on the advantaged side of the digital divide.

In at least one case, the EdTech unit was involved in deliberations around computer access on campus. Part of the EdTech unit's work was described as to:

[11] South African public schools are categorised along five quintiles. Quintile 1 and 2 schools receive the highest state subsidy because they serve the poorest sector of society, but they do not charge school fees and generally have the highest learner to teacher ratio, the poorest infrastructure and the least qualified teachers.

[12] NSFAS is the National Student Financial Assistance Scheme, which allocates funds to university students whose families earn less than R350 000 per year.

> Source funding and space to set general labs for students and staff labs for training and materials development (SR65Q20).

There were computer labs for students at all the universities, and it was acknowledged that:

> … the university is doing a lot to give students access and to provide the resources and infrastructure but they are limited by their own resources, their own funding (IR007).

It, therefore, appeared that funding for infrastructure and resources to equip students with EdTech skills was a constraint at some universities.

7.6 Technology is not just being added to education

There was some discussion that including technology in education was much more than simply attending to student demand or enabling student engagement, it was fundamentally changing the nature of university education. The introduction of the various EdTech tools including mobile learning devices is noted in the literature to have transformed educational practices (Padayachee et al., 2015). These devices had changed ways of teaching and learning by offering innovative methods to disseminate information to students. The White Paper on e-Education (DoE, 2004: 17), indicates that students should be able 'to use ICT confidently and creatively to develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community'. This was also referenced in the data, such as:

> … working towards the institution's White Paper goals, which is to have 21st century students (SR2Q8)

> …. Beneficial to the 21st century learner to improve the teaching methods (SR1Q26).

There was, thus, a strong indication that the use of EdTechs was seen to crucial as it related to students of the 21st century:

> Definitely, I believe that there are several ways educational technology can improve the quality of higher education. For instance, EdTechs improves access to learning resources for both students and lecturers. They can access resources such as books, journals, artifacts on any topic can be accessed online. Also, for those with access to

> the internet and web resources, the course content taught in multimodal forms such as use of simulations, graphics, videos, films or movies, thus also facilitating improved understanding of the context. This allows students of different learning speeds to understand the subject matter at their own pace and using their preferred learning style (IR023).

Some participants argued that technology-enhanced activities offered student satisfaction by:

> Providing access to a variety of information sources (websites/databases/journal articles/videos) to broaden students' perspectives, using communication forums to facilitate discussions amongst students and between the students and the lecturer(s). Students can consult with their lecturers online to gain support within the inconvenience of having to locate the lecturer in person or being restricted to 'office hours'. Online testing facilities can facilitate self-testing and encourage more self-regulation in students. Providing activities using simulations that promote exploration of phenomena (SR7Q241).

7.7 Conclusion

The demand by students for technology to be included in their courses, along with the understanding that EdTechs could enhance student engagement and allow for self-directed learning were thus important enabling mechanisms for the uptake of EdTechs. There was some reference to students' technological capacities on entering the university and the constraints on access to hardware and data but these were limited in the data and greatly outweighed by the data on the benefits of EdTech for students and the understanding that using technology was expected for preparing students for the 21st century.

Chapter 8 – Then 2020 happened: A literature review of EdTech during the pandemic

8.1 Introduction

This PhD has provided a detailed description of the mechanisms conditioning the uptake of EdTech across the South African higher education sector. The realist underpinning entailed moving beyond describing the data to identifying the causal mechanisms that allowed the data to emerge in the ways that it did.

However, after data collection, an incredibly powerful mechanism came into play that had significant effects on EdTech use. The spread of COVID-19 and the subsequent restrictions used to prevent its spread affected every aspect of life, including the ways in which teaching and learning were undertaken in the universities in this study.

Archer's (1995) morphogenesis/morphostasis account of the social world suggests that nothing happens on a 'clean slate'. Any new person enters a pre-existing place and is conditioned by that context. Any new policy is implemented within a pre-existing institution and its implementation is conditioned by that context. Any new idea is introduced alongside pre-existing ideas and the extent to which it takes hold will be conditioned by that context. In the same way, Covid-19 came into the pre-existing higher education context and the ways in which universities responded to the virus were conditioned by their pre-existing contexts. The findings of this study, therefore, offered insights into the conditions within the various institutions which framed their responses to the pandemic and EdTech implementation. My study thus offers T_1 and what happened during the pandemic, T_2 to T_3, was not streamlined, generic or straightforward because it was conditioned by T_1.

Understanding the pre-existing conditioning mechanisms not only helps EdTech practitioners to understand the responses to the pandemic but also helps with making sense of what might be the way forward with regard the use of educational technology in South Africa's higher education sector. This chapter, therefore, offers a brief look at the literature on how EdTech was used during the pandemic to ensure that teaching and learning continued. I draw on both

international and national literature and, where possible, I make links back to the findings offered in the previous three chapters, that is, chapter 5, 6 and 7.

For some decades now, it has been forecasted that there would be a greater demand for online teaching and learning and that the future of higher education would be online (Selingo, 2013). But the promised radical reimagining of higher education has been slower and more uneven than many imagined (Christensen & Horn 2013; Finkle & Masters, 2014). As indicated in the earlier literature review in Chapter 2, most students who study online do so in conjunction with face-to-face learning and retention rates for entirely online programmes are abysmally low (Palvia et al., 2018). Although the promised EdTech revolution turned out to be more rhetoric than reality, over the last two decades there have been several subtle yet significant shifts online such as using learning management systems to organise courses. As was shown in this study, by 2019, only a few programmes in higher education in South Africa were without at least some kind of online presence.

However, with the onset of the COVID-19 pandemic in 2020 happened, saving the academic year meant everyone had to implement online access. For some, this was an exciting opportunity to try out new approaches, but for others, this was terrifying and highlighted the resistance to technological skills outlined in Chapter 6. Regardless of the reactions of academics, the changes wrought in a matter of weeks were truly impressive (Mhlanga & Moloi, 2020). As Mahlaba (2020) notes everyone was rushing to make plans to save the academic year.

Once the directive by the World Health Organisation that public spaces including teaching and learning facilities should be locked down to prevent further COVID-19 spread and the need for social distancing, masking and other regulations were put in place by countries around the world, enormous changes became inevitable. In South Africa, as it was across the globe, teaching and learning situations changed radically to maintain learning (Gumede & Badriparsad, 2021).

Lecturers and students were expected to suddenly adapt to the new norms and new ways of learning by conforming to online learning systems and practices. Remote learning was a necessary response to the situation (Bhagat & Kim 2020), but it is clear that the COVID-19 pandemic exposed even more starkly the lines of inequality and the uneven educational structures within South Africa that my study explicated.

The study indicated the various positions along which EdTech was taken up. As a result, the pandemic entered a system where some universities had well-resourced EdTech support and a critical mass of academics integrating technology into their curricula. It cannot be suggested that the consequences of the pandemic were minor in these institutions and for such academics, but certainly they were be in a better position to manage the pivot online. But even within such universities, my study indicated that the use of EdTech was voluntary and that many academics resisted it for various reasons. These academics now found themselves without a choice and on the back foot. This sudden change of teaching mode seems to have caught some academic staff and academic support staff by surprise (Czerniewicz, 2020). Certainly, there is the view in the pandemic literature that this was a "wake-up call" for most HEIs (Mhlanga & Moloi, 2020; Czerniewicz, Agherdien, Badenhorst, et al., 2020) and that no university managed the process with ease, though some certainly coped better than others as is discussed in this chapter.

The effects of the pivot online were not only ones of technology and access, though those were certainly central. Blankenberger and Williams (2020) indicate that the effects went as far as issues of budget constraints, student enrolments, research, curriculum delivery, assessment, and institutional responsibility. Mhlanga and Moloi (2020) suggest that it will be challenging for the higher education sector to return to the former traditions of face-to-face teaching. However, as the vaccine roll-out is in place, students and lecturers are beginning to return to campuses. As a result, the extent to which the lessons learnt during the pandemic will be used remains unclear.

8.2 Emergency Remote Teaching

As Hodges, Moore, Lockee, Trust and Bond (2020) indicate, what most academics did in 2020 was not the careful design of online curricula, rather emergency remote learning (ERT) was provided, with many in survival mode, uploading texts and producing narrated PowerPoints. To be fair, all were working with a lack of certainty about how long this would go on for and were grappling with concerns about whether students had the required hardware, software, data and technical literacy to cope. At the same time, both students and staff were managing the enormous emotional upheaval of this uncertainty. The rush to get study materials online

left little space for reflection on how to enable epistemological access within the virtual environment, that is, access to the ways of making knowledge in our fields (Morrow, 2009). As I indicated in Chapter 6, if EdTech staff together with academics fail to design courses, activities and assessments for epistemological access, then quality education will not be provided, whether it is online or offline.

Emergency remote teaching (ERT) is defined as:

> A temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances. It involves the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has abated (Hodges et al., 2020).

According to Hodges et al. (2020), it takes between six and nine months for the successful development of an educationally sound online course. However, due to the sudden move as a reaction to the COVID-19 pandemic, these processes could not be adhered to. Notions that course development for online learning ought to focus on students obtaining the required knowledge through a student-centred approach, which focused on engagement (Rapanta, Botturi, Goodyear, Guàrdia & Koole, 2020) were often abandoned during the pandemic because of the urgency of the context. Ando (2020) argues that students' sociocultural backgrounds need to be considered for the successful implementation of online teaching and learning. However, during the pandemic, the focus was often on ensuring access to relevant materials with little time for careful consideration of these issues. The rapid increase in use of EdTech during the pandemic could thus be seen at times to replicate many of the problems identified in this thesis, whereby materials are uploaded but curriculum design and student engagement are not prioritised. It would seem that online learning during the pandemic was of necessity more reaction-based rather than a solution that provided students with meaningful access to broader university resources. (Boughey & McKenna, 2021).

It is very evident from the literature, and from my personal experience, that the workload of EdTech staff was enormous during this time. Perez (2020) and Morris (2020) both reflect on the kinds of support that were needed. The EdTech support staff ensured that academic staff

were prepared for this quick transition but the extent to which they were able to attend to 'both pedagogic and technologic levels' (Guerra et al., 2021: 93) is debatable, and the findings of this thesis suggest this would have been uneven. Certainly, there was a move from 'Should we engage in EdTechs?' to 'How can we use EdTech to navigate this catastrophe?'

Access to devices, data and resources are certainly a necessary condition for successful use of EdTechs, and these issues were a significant challenge, but even where these are in place, this does not mean that teaching and learning is of quality (Czerniewicz, et al. 2020).

Rapanta et al. (2020: 924) argue that successful online education entails 'pedagogical content knowledge (PCK)' and involves careful planning for improved student learning. But the circumstances of ERT during the pandemic meant that these were not always able to be prioritised. Houlden and Veletsianos (2020) go so far as to warn that the rapid uptake might result in the use of untested EdTechs, which may lead to unintended outcomes.

8.3 Highlighting inequalities

Pre-pandemic inequalities and exclusions continued under the pivot to emergency remote teaching (Murrey, Puttick & Sultana, 2020). While some universities were able to make the shift relatively easily, others found themselves having to put in place many processes to continue. While the online systems and tools were readily available in most universities for this sudden move, not all institutions had LMS systems in place at an institutional level to carry on with learning activities.

A research study by Salmi, Arnhold and Basset (2020) for the African University Association identified that only a limited number of the 700 institutions of higher learning in Sub-Saharan Africa were ready for remote learning. Among the constraints were infrastructure and connectivity issues, which continue to challenge most of these countries including the need for a reliable uninterrupted power supply. South Africa was in a very similar position to other countries on the continent, albeit unevenly so as some universities could continue classes fairly easily. Although HEIs across the globe rushed to remote learning without proper

continuity and operational plans, which affected each university in each country, the problems of access were mostly apparent in the marginalised parts of the world (Salmi, 2020).

While some literature from South Africa reported on reasonable plans and structures being put in place to reduce the social constraints that may have interfered with curriculum completion (Kele & Mzileni, 2021), others battled to ensure that all academics were able to work on the LMS platform, and that all students had access to the online spaces. As was noted in the findings chapters, a number of SAHE universities had existing experience in using the technologies, which allowed them to suddenly change all teaching and learning online, and they were not starting from scratch with unknown quick solutions. But in others the LMS was not very widely used and many academics and students had to be inducted into it from a distance. Czerniewicz et al. (2020) also indicate that ERT played out unevenly across the SAHE along the exact lines as identified in my study. As a result, ERT during the pandemic highlighted and perhaps even exacerbated the inequalities in both physical and epistemological access.

As indicated in Chapter 7, face-to-face campus activities could hide inequalities in access. Students could rely on the WiFi, libraries and computer labs on campus to get on with their studies. On the other hand, students who did not have computers and data at home had to rely on these at their universities. However, when the pandemic struck, many students were without any kind of access. It is of interest that in some universities, many academics were also stranded without access as they were isolated in their homes without computers or data as they did not own laptops, did not have WiFi or lived in areas without signal. There are examples in the literature of students having to 'eavesdrop' on the only places in their village where WiFi was available, such as in local clinics (Czerniewicz et al., 2020).

The #feesmustfall protests was shown to have enabled many academics to experiment with online teaching and learning, but this was now of a different order entirely. Those universities more affected by regular lockdowns and student protests battled to implement ERT widely or smoothly and some students were clearly left behind in the process. It, thus, seems that in institutions with regular shutdowns, this had not served to build familiarity with online learning, but rather served to build a culture of accepting that such delays and interruptions are to be expected. The extent to which universities rushed to address the pivot to emergency remote teaching, therefore, also varied. Different universities also 'had different negotiating

power and access to providers for coming to workable solutions' (Czerniewicz et al., 2020:954) for providing devices, zero-rated data for continuity with online learning and internet data top-up to student cell phones. The logistics of purchasing laptops and data for students and staff who did not have any was extremely complex. Couriers were often sent to places without street names or numbers (Czerniewicz et al., 2020). But it was evident that some universities had the resources to manage these complex logistics better than others.

It should be noted that 'governments in Sub-Saharan Africa, in particular, have tried to strengthen broadband capacity through the National Education Research Networks (NRENs) and reinforce campus network infrastructure' (Salmi, 2020:7) for many years before the pandemic. As indicated in the study's findings, progress in this regard was made, but this remains a significant problem and one that is very unevenly experienced. A number of African countries also experienced constraints in effectively launching ERT during the pandemic owing to poor and unavailability of the necessary IT infrastructure (Salmi et al., 2020).

The readiness of universities to offer transformative learning online is questioned in the literature (Houlden & Veletsianos, 2020), especially in cases of poorly managed universities (Bhagat & Kim, 2020). When this is coupled with a disadvantaged student body with very limited access to technology then there are significant challenges in the extent to which they could respond to learners' needs in the pandemic (Zhong, 2020).

The digital divide, discussed in Chapter 7, was exacerbated during this time. Some students, owing to their secluded areas and geographical location were unable to connect for the duration of their scheduled online sessions. Despite the intervention by various institutions to provide students with laptops and free data bundles, the various network service providers' low signal strength in most rural areas in South Africa contributed vastly to this connectivity constraint. In response, some universities distributed paper-based materials to students who were experiencing unstable connectivity (Mahlaba, 2020).

While a number of previously advantaged institutions decided to strengthen and continue with remote teaching and learning, some previously disadvantaged institutions faced several constraints related to access to technology, finances in rolling out devices and uneven infrastructure. It is interesting that the discussions about such issues did not only come from

the Global South as they were also reported in the literature from highly resourced countries such as the USA (for example, Bhagat & Kim, 2020).

These inequities, for example, lack of proper EdTech and connectivity, are a result of the various social injustices that pervade our societies and these had a direct impact on student knowledge, access and success during the pandemic (Johnson, Seaman & Veletsianos, 2021; Salmi et al., 2020). In cases where the resources were in place and there was experience in online learning, the effects on student learning were minimal, as shown by Iglesias-Pradas, Hernández-García, Chaparro-Peláez and Prieto (2021) study in Spain. So, the divides between universities seem to have been increased during the pandemic. A study conducted by Salmi (2020), who was previously the tertiary education coordinator for the World Bank and is now a professor of higher education in Chile, highlighted that in that country the move to online learning increased the 'ongoing racial injustices have led to social uprisings and unrest, reinforcing the deep systemic racism in the country and the need for reform' (2020: 1).

Alongside a lack of the physical requirements for the pivot, many academics also did not have the 'skills and competencies to engage with remote teaching' (Czerniewicz et al., 2020:954). This this placed enormous challenges on EdTech staff.

8.4 Challenges

The study finding in Italy by Ferri, Grifoni and Guzzo (2020) pointed to a range of constraints on the pivot to ERT, including pedagogical, technological and socio-economic challenges, so these challenges were not unique to South Africa. Ando (2020) further reminds of the importance of shared values and beliefs and collective action from both the instructor and students for effective use of e-learning. The pivot to ERT happened within the pre-existing institutional structures and cultures, so in cases where the uptake was widespread and pedagogically sound, the pivot was smoother. Where EdTech had been little used or was used in problematic ways, this continued to condition what happened during the pandemic.

Iglesias-Pradas et al. (2021) in their study of the effects of the pivot to ERT in a telecommunications course in Spain found that student engagement and success actually

increased during the pandemic. But they urged readers not to assume that this can be taken at face value, and they outlined the contextual issues at play in their case study. Significantly, they note that strong organisational factors, including an extensive use of the LMS before the pandemic, students having access to hardware and bandwidth, pre-existing strong communication channels improved the ETT pivot. Many of the issues they note as underpinning the successes of students in their study were found to be lacking or uneven in my study.

According to the data findings from this study (see Chapter 5: The structure and staffing of EdTech, EdTech staff roles and responsibilities, staff development workshops, Chapter 6: Educational technology as enabler of quality education and Chapter 7: Students in the 21st century), in South Africa, the use of online learning was largely voluntary. The uptake was thus not only uneven across the sector, it was also uneven within each university. Furthermore, the actual form of LMS use varied significantly with many EdTech staff indicating that the LMS was simply a 'dumping ground' for the uploading of materials (see Chapter 6). The pedagogic constraints included that EdTech was seen as a one-size-fits-all solution to the situation. The lack of EdTech skills was a global issue, which in many cases resulted in the 'lack of online social and cognitive presence (the ability to construct meaning through sustained communication within a community of inquiry)' (Ferrie et al., 2020:86). The pivot to ERT was largely focused on getting materials onto the LMS, either in the form of texts or narrated PowerPoints or videos of lectures, rather than on thinking through issues of epistemological access and student engagement. The concern that the participants in my study raised that the LMS was a repository rather than a carefully designed learning space was increased during the pandemic.

Most academics resorted to those tools they were already familiar with, and there was often a desire to simply offer synchronous classes online as these mimic face-to-face learning (Iglesias-Pradas et al., 2021). But in South Africa, it very quickly became evident that many students could not attend lengthy zoom sessions because of practical issues of bandwidth and signal strength. Some lecturers, therefore, made videoed recordings that students could download when they were able to get into a WiFi area; others started using WhatsApp and other low data means of communicating. The issue of student attendance was a major

concern during the pandemic as some students relied on these recorded sessions, which they could access with free internet bundles negotiated with service providers by most South African institutions (Mahlaba, 2020; Czerniewicz et al., 2020) but they then did not benefit from engagement with their lecturers as they would have done in class or if the lecture were offered synchronously.

Online learning when done well increases the work of the academic (Iglesias-Pradas et al., 2021). For those academics who were unfamiliar with online learning, this workload was enormous as they had to learn the basics of using an LMS and preparing online materials. Importantly, academics were having to work in a new workplace, that is, their own homes and in many cases, these may not have been ideal as they may have had interruptions from family members and other constraints. Students also battled with the issue of studying from home, especially those whose home conditions were not conducive to study requirements (Boughey & McKenna, 2021).

In many universities, the EdTech staff developed quick guidelines, crash courses on online teaching, and online self-paced courses to assist academic staff with this move. Academic staff had a variety of support structures and a wide selection of the available different EdTech tools to use for continuity with teaching and learning, but the extent to which they could take these up was conditioned by all the mechanisms identified in Chapters 5, 6 and 7 (the structure and staffing of EdTech, EdTech staff roles and responsibilities, staff development workshops, educational technology as enabler of quality education, and students in the 21st century).

Many lecturers found the ERT process to be extremely stressful (Hodges et al., 2020). This anxiety was not surprising given the findings discussed in Chapter 6, that even before the pandemic, many academics were fearful of technology. The sudden online move ‘added to the stresses and workloads experienced by university faculty and staff who were already struggling to balance teaching, research and service’ (Rapanta et al., 2020: 2).

The study by Czerniewicz et al. (2020), which considered 15 of the 26 South African universities, highlighted that EdTech support staff previously empowered academics with the use of EdTechs, including blended and hybrid learning. However, the impact of COVID-19 pushed these support staff to run with the sudden change of going completely and fully

online, thus, offering extreme level of support. The workload of EdTech staff increased exponentially during this time but so too did their institutional influence and the recognition of the importance of technology for teaching in the 21st century. It remains to be seen whether those universities that had previously provided very little by way of recognition for EdTech would now better resource these centres. Drawing on the work of Czerniewicz et al. (2020) shows the networks of care developed by EdTech staff and the extent to which they collaborated and supported each other across institutional lines. As shown in my study, the ability to forge corporate agency through building networks and collectively representing issues of interest was significant. Communities of practice forged before and during the pandemic could underpin ongoing enhancements in EdTech use in South African universities.

8.5 Looking forwards

The eruption of COVID-19 was 'a wake-up call' to the higher education structures in South Africa (Mhlanga & Moloi, 2020). Universities that had avoided putting in place strong EdTech resources were caught short. Certainly, more academics can now use LMS and other forms of EdTech, and there is every likelihood that they will continue to do so, at least to some extent, but whether this will be undertaken in pedagogically sound ways is unclear. As this study has repeatedly shown, the use of EdTech requires more than technical proficiency, it also requires careful planning to ensure that there are multiple opportunities for student engagement and that the materials are designed in ways that enable epistemological access. As Czerniewicz et al. (2020) note, where poor teaching and assessment happened face-to-face, this continued during ERT. Where a technocratic approach existed before the pandemic (and where pedagogical issues are downplayed in relation to EdTech), this continued and conditioned the ability of universities and individual academics accordingly.

Online learning provides opportunities for rapid-response spot-quizzes, amazing simulations, entertaining videos and so much more. But teaching towards epistemological access is harder online (Bettinger & Loeb, 2017; Joshua et al., 2015), where getting informal, on-the-spot human feedback can be a challenge. Simply putting content online without mediating the process of taking on disciplinary forms of knowledge and ways of knowing is not teaching.

Teaching requires a great deal of pedagogical expertise and high levels of reflexivity. During the pandemic, most academics were understandably simply trying to get the basics up and running, and had little time to consider the most educationally sound ways of using EdTech. But the findings of this study suggested that this would be an ongoing issue if EdTech was not well understood and supported within our universities.

As a result, having access to content is insufficient; students need to learn how knowledge is made, why it is communicated in disciplinary-specific ways, what kinds of knowers are needed to succeed in that knowledge domain, and much more. This is the difference between access to information and genuine epistemological access. And this is why people register for an education in fields where the subject-matter is readily available on YouTube, blog posts and online encyclopedias.

According to Houlden and Veletsianos (2020: para. 16), 'teaching online isn't a solo sport', academic staff require training which includes 'how to involve students in online discussions and facilitate their deeper understanding of taught material'. But as my study has shown, the availability of EdTech staff and the extent of their own pedagogical expertise varies significantly. While the pivot to ERT may have rapidly increased the uptake of EdTechs, the extent to which these EdTechs 'introduce innovative curricular and pedagogical practices' (Salmi, 2020:13) is varied. The successes of the system, especially given the enormous constraints on physical access, needs to be celebrated, but moving forwards, we need to ensure that online learning attends to pedagogical matters. EdTech staff together with academic staff have a responsibility to create future online teaching and learning opportunities that are more collaborative and structured in nature including e-learning materials that enhance the quality of e-learning for students (Vergroesen, 2020).

In institutions where the ERT transition seemed most successful, students were afforded responsibilities to direct their learning, 'this compels students to be self-directed in their remote learning' (Mahlaba, 2020:123), and self-directed learning promotes independence, which can assist in the development of personal learning for students to succeed despite the pandemic (Roberson, Zach, Choresh, & Rosenthal, 2021). Where flexibility for self-learning was implemented during ERT, this might continue after the pandemic (Johnson et al., 2021).

And where academics were sufficiently supported to make the pivot to ERT, this might provide the springboard for them now to engage with online learning in pedagogically sound ways.

In the United Kingdom, Prime Minister Boris Johnson (2021) indicated that for online and hybrid learning to continue post-pandemic, it is imperative that access and a reasonable high-speed internet be rolled-out, including access to necessary learning devices. Given how much more stark these issues are on the African continent, it is imperative that universities collectively engage with their governments and service providers for better and more affordable internet access.

8.6 Policy implications

During COVID-19, there were new strategies designed to provide access to rapid technology implementation, such strategies were meant to provide education resources and virtual class infrastructures post-covid (Tadesse & Muluye, 2020). However, the policy to implement the continuity of online learning seems to have implications of monitoring students from home (Rulandari, 2020). A study by Masuku (2021) recommended that remote teaching be included into government policy for open tertiary education for all South Africans, as a result, the adopting of such remote teaching and access to all, aligns with the United Nations' policy on admission to higher education for all (Masuku, 2021). There was a belief that the COVID-19pandemic is an opportunity influence policy-makers to shape a better higher education system (the education system back better (Hollweck & Doucet, 2020).

The World Bank (2020) proposed to policymakers for a combination of policies to include technical and low-cost strategies in various contexts. Such policies and planning can be applied to maintain inclusive education systems globally. The phases of policies were suggested to include the expansion of student technology skills, adjusting curriculum and assessments strategies, keeping at-risk students engaged, providing autonomy to academics, implementing data/analytics and adapting quality assurance regulations (World Bank, 2020).

8.7 Conclusion

In this chapter, I have looked briefly at the literature on EdTech use during the COVID-19 pandemic. I have tried to show how the mechanisms identified in Chapters 5, 6 and 7 of my study could have conditioned how universities transitioned to ERT. In many ways, the pandemic shone a spotlight on the very different structures and cultures of South African higher education institutions and how these played out in a crisis. The extent to which the pandemic would have provided a changed T_4 remains to be seen. Certainly, the uptake of EdTechs has increased significantly, but if the ways in which EdTech is understood (in the domain of culture) and resourced (in the domain of structure) remain as they were before the pandemic, then this increased uptake is unlikely to lead to significant pedagogical improvements. Chapter 9 provides conclusion statements on the findings of the study. It offers some limitations that were experienced during data collection and analysis, including some suggested recommendations for future research in the field of EdTechs that emerged as constraining mechanisms in the study.

Chapter 9: Conclusion

9.1 Introduction

This study set out to understand the mechanisms that enabled or constrained the uptake of educational technology across the South African higher education sector. As many studies on the use of educational technology in South Africa were only institution-wide, it is important to note that this was a large-scale study that included data across the higher education sector. From the study's survey data, 19 institutions participated with 56 participants, and 24 interviews were conducted with educational technology staff from 15 institutions. The combination of a large-scale study and the use of multiple data sources, including survey interviews and institutional documentation allowed the research question to be answered with both depth and breadth so that the use of educational technology across the sector could be determined. Figure 9.1 depicts the participation per institution type across both data sets.

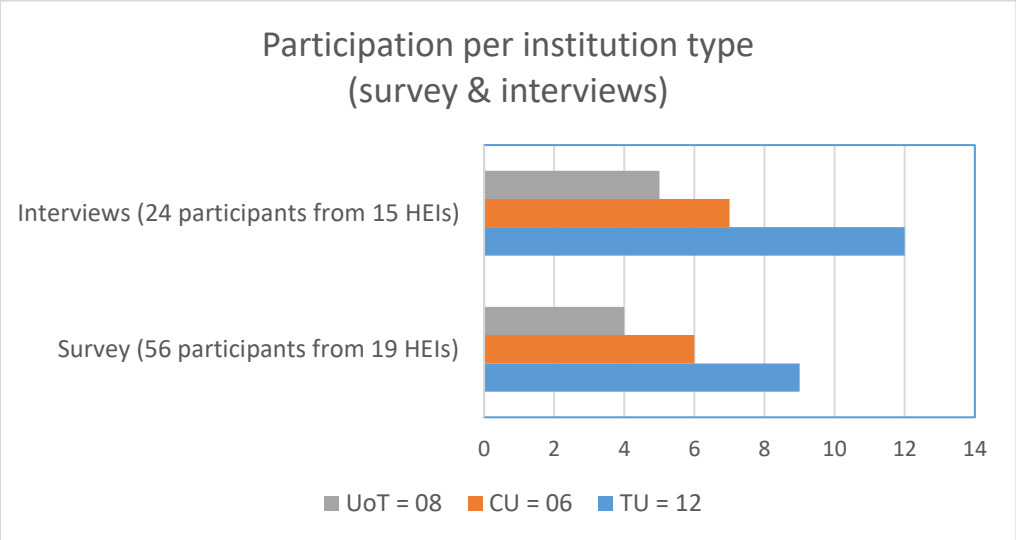

Figure 10: Graphical representation of participation per institution type (survey and interviews)

This large-scale study was undertaken with a realist underpinning, which meant that I had to move from a description of the data as a set of events, which included the use of educational technology and a set of experiences of how educational technology staff understood the use of EdTechs. Critical realism demanded that I moved from just describing these events and experiences to identifying the mechanisms from which such events and experiences emerged.

As CR demands a 'judgemental rationality' (Bhaskar, 1998), I sought to offer the most likely account of the mechanisms underpinning the data. However, critical realism also accepts 'epistemic fallibility' (Bhaskar, 1998) in that I am human and constrained in my identification of mechanisms by my own experiences and perceptions. I attempted to temper this constraint by receiving input from my supervisors, presenting my work-in-progress at my research group and at conferences, and including data quotes in my findings chapters to demonstrate to my readers how I reached certain conclusions. Nonetheless, critical realism literature makes clear that research is always partial and fallible.

A realist study meant that I could not come up with simplistic causal explanations that a certain mechanism would always lead, in all contexts, to a certain outcome, rather I needed to understand and demonstrate how these mechanisms worked in interplay, some of which were complimentary and some of which were contradictory. This was crucial in understanding the variation in the uptake of educational technology across the higher education sector. In this chapter, I review the identified mechanisms and reflect on the significance and limitations of the study.

9.2 Uneven EdTech uptake across the sector

The study allowed me to establish some clear findings of the enablements and constraints that could help to explain the very uneven uptake of educational technologies across the HE sector, which is often referenced in literature (Czerniewicz & Brown, 2009). However, the immense scope of the study meant that it was not possible to look in-depth at differences in EdTech uptake within each of the institutions. The EdTech participants all indicated that the uptake was not evenly spread within their universities, but this study did not look in detail at where the uptake was happening. As indicated, this study found that 'EdTech champions' within a department were key enablers, particularly if they were heads of department because then, as social actors, they could positively influence their colleagues in this regard. The study also established that the nature of the discipline or field played some role as a mechanism enabling or constraining uptake, but the sector-level scope prevented a detailed investigation of this. Studies such as Mistri (2017) and Czerniewicz and Brown (2009) helped

to make sense of this uneven uptake even within one university, but further study in this regard is recommended.

During the data analysis, it was identified that educational technology was very differently resourced across the sector with some institutions not having designated educational technology units and EdTech staff but relied on the expertise of a few individuals in the IT departments. On the other hand, many universities, particularly historically advantaged institutions, had well-established educational technology units that were well resourced. The resourcing was not only in terms of the unit, but also in terms of the staffing and hardware available to them. In some cases, the EdTech units were stand-alone but there were also many cases where they were part of the academic development centre.

In the findings, it was not only the structure of the EdTech units that differed amongst institution, it was again the nature of the EdTech agency available, which was conditioned by the employment status of the EdTech staff. In some institutions, educational technology staff were permanent staff members who had academic qualifications. This was identified as affording them with greater credibility and more institutional influence in being able to work with academics, to the extent that, in a few cases, academics and EdTech unit staff undertook joint curriculum development and research projects. On the other hand, in some institutions, EdTech staff were appointed on contract, sometimes funded by university capacity development grants. This meant that there was often a higher staff turnover and, significantly, they were often appointed as administrators. This suggested that they did not always receive the same level of credibility with academics that they were meant to support. In such situations, EdTech staff were often seen to be more end-user support rather than academic development practitioners. Also, in cases where they were appointed as administrators, they were not required to have academic qualifications and, as a result, in such institutions, the educational technology staff were not as well qualified. However, interestingly, even where they were appointed as support staff with some form of academic qualification, there seemed to be a desire amongst educational technology staff to improve their formal qualifications.

The EdTech staff indicated that the use of educational technology in their universities was largely on a voluntarily basis and so it was up to individual academics to decide whether or

not they wanted to use educational technology, the extent to which they wanted to use it, and the extent to which they wanted to collaborate and get support from EdTech staff in doing so. The EdTech staff indicated that they preferred to work with people who wanted to work with them because then there was complementarity between the personal projects of the individual academics who could then draw on their agency to seek out support from educational technology staff. They noted that in a few cases where there was a faculty or department drive to use educational technology, then often there would be a wider collaboration with EdTech unit beyond the individual at the department level to take up educational technology.

9.3 Roles and duties of EdTech staff

EdTech staff had a variety of names and titles across the different institutions. They were known as instructional designers, educational practitioners, curriculum and learning development specialists, learning designers and academic developers. There seemed to be misalignment of the roles of EdTech staff that was also discussed in Chapter 2 (see Section 2.7). The IBSTPI competencies and standards developed by Richey et al. (2000) was seen to be a useful framing of the roles of EdTechs staff in the universities, as indicated in Chapter 2. However, Hodgkinson-Williams and Czerniewicz (2007) raise concerns that these roles are not well developed in South Africa. Reflecting on the findings of this study, it would seem that this remains the case. The analyst role, evaluator role, e-learning specialist role and project manager role were all evident to some extent in the data, with a focus on the implementation of an LMS. However, there were not many examples of performance analysis or quality assurance of e-learning in the data.

There were a range of ways in which educational technology staff worked with academics. They offered individual and departmental consultations, presented a range of workshops and, in some cases, there were even formal qualifications offered in EdTech. These activities also differed in the various institutions and seemed to depend to a large extent on the capacity available. In a few cases, EdTech staff also worked directly with students, particularly around orientation on the use of the LMS and basic technology literacy.

There was a continuum on how the educational technology staff understood their own work, with many understanding themselves as academic developers working with academics on issues of pedagogy and educational technology. On the other hand, a few EdTech staff saw themselves more as end-user support for academics and, therefore, focused on their IT expertise. In some cases, the participants raised a concern that they were being seen by academics as end-user support rather than as academic developers. Therefore, there was a continuum of educational technology use, ranging from a focus on the more technological side to an equal focus on education and technology use.

This continuum was seen, at least in part, in the extent to which the EdTech staff themselves drew on theory to explain their own work, compared to EdTech staff who did not discuss theory at all but described their work in more practical end-user ways. The range of theories that were drawn on by EdTech staff was very wide and included theories like CHAT, constructivism, authentic learning and self-directed learning. What these theories had in common was the idea that learning is more than the transmission of content and that to have a true epistemological access, students needed to be actively engaged in the learning process. Implementing EdTech was then understood as designing towards epistemological access and active engagement.

The findings discussed in Chapter 6 included that educational technology was seen as enabling quality education. However, it was also seen as not being something that was good in and of itself, indeed a few participants indicated that technology was not necessarily good. It was only seen as good if it were used in ways that worked towards student active engagements. There were concerns expressed by a number of participants that, at times, the technology, especially the LMS, was used simply for content transmission. There were a number of discussions about it being used as a repository for materials.

The study also revealed discussions about resistance from some academics who felt that they were being forced to use educational technology and did not see it as necessary. Moreover, they saw this online shift as being burdensome. Even those who were interested in educational technology referred to time constraints and heavy workloads that made it a challenge to use educational technology to any great extent.

9.4 Strategies to enable EdTechs

At the level of structure, it was clear that some institutions had strategies at an institutional level or even within the EdTech unit that clearly articulated what educational technology afforded and the purposes to which it should be used. Where there was clearer articulation within strategies of the benefits of educational technology, this enabled the uptake of educational technology. Alongside the enabling structure of strategies and policies, came the enablement of certain social actors, which was particular people in top management positions. Where the management referred to the use of educational technology as a pedagogical benefit and as being something worth spending time, investment and energy on, that was also an enablement for the uptake of EdTechs.

Interestingly, the data showed that the student protests in 2015/2016 served to some extent as a kind of trial run for the COVID-19 pandemic of having to move all teaching and learning online quickly. Although there were some conflicting views about implementing EdTechs actively during student protests, EdTech staff noted a sharp increase in the uptake of EdTech during and after the protests. While this uptake was seen to be positive, there were also concerns that this was largely in the form of simply providing additional content in a variety of ways, such as recorded lectures, documents and notes.

Another set of findings was that the drive towards the uptake of educational technology came from students themselves. Students were often technologically adept and expected their education in the 21st century to include the use of technology. A number of EdTech staff indicated that academics contacted them saying that they needed to learn more about educational technologies because student survey evaluations had indicated that students wanted EdTechs to be fully implemented in their learning. However, the data also showed that it should not be assumed that all students were technologically adept and had access to technology. There was also clear evidence of students struggling with technology in terms of understanding how to use it, challenges of accessing the hardware and also importantly in terms of connectivity issues from their various residential locations.

All of these findings collectively demonstrated the extent to which the structure and culture of each institution was an important mechanism in conditioning whether or not educational technology was taken up. If the structure of policies, the social actors, in terms of the

university management, and if the individual academics held certain values, in terms of their personal projects and these were aligned in a complementarity situation, then EdTechs would be more likely to be taken up. However, in a number of cases this was not what happened, and instead the EdTech staff found themselves positioned with few resources and little support, which constrained the uptake within their institutions.

9.5 Significant shift brought about by COVID-19

Having undertaken this study in a pre-pandemic environment necessitated reframing it to take the current context into account. As Chapter 8 indicated, the pandemic brought about significant shifts in the use of educational technology across the world and in South Africa, which had important implications for the findings of my study. I have shown that the differentiated nature of educational technology uptake in the South African higher education sector conditioned the extent to which universities were able to respond sufficiently and rapidly to the need for emergency remote teaching. In cases where there was a pre-existing well-established educational technology unit, these institutions were far better placed to make this shift. However, even where they were such institutions with favourable conditioning, there were a number of academics who resisted the use of educational technology. These academics were probably the ones with the least technological capacity and were now urgently needing to have support online teaching and learning. So regardless of the institution and the extent to which there were preexisting enabling conditions, the work of educational technology staff during the pandemic was extreme. If the lessons learned during the pandemic are to be taken forward with the continued use of technology as campuses re-open, it will be vital for institutions to revisit the findings of this study as they will continue to condition EdTech use in the HE sector nationally.

9.6 Limitations of the study

One major limitation of the study was that the study focused on educational technology uptake at the time of T_1 and, since then, COVID-19 brought about T_2 to T_3. This was entirely unexpected at the time of data collection and analysis. This meant that the study's findings might be considered, as I have argued that they remained important in that they provided a

nuanced understanding of the conditions within which universities had to respond to the pandemic. As a result, the findings could provide an understanding of the differentiated nature of the ability of universities to shift to emergency remote teaching.

Another limitation was that for ethical reasons, I could not identify universities in any of the data. This made it a challenge to demonstrate the extent to which particular universities either had enabling structures and cultures. I was not able to specify which universities were highly resourced with a lot of agency in EdTechs units or which universities had the reverse, that is, very constraining structural and cultural conditions and very limited resourcing in agency of educational technology staff.

Another study limitation was that while this was a large-scale study, the first of its kind, it nonetheless did not include all South African higher education institutions because the data came from 19 universities responding to the survey and from 15 universities in the interview data. However, there are 26 universities in South Africa. While the HEI sector gaps are a limitation, the study nonetheless provided sufficient coverage of the sector to be able to make sense of the sector as a whole. There were three universities who were neither in survey and interviews data sets who indicated by email that they did not have a focused EdTech system and support yet, and that only IT technicians were available. They indicated that they were in a process of establishing EdTech units and of implementing an LMS for their online teaching and learning. It is important to note that they would nonetheless have had to respond to the pandemic and its need for emergency remote teaching.

A final limitation of this study was that it considered the events and experiences reported by EdTech staff only. While they provided rich data about students, academics, IT staff and institutional management as well as the enabling or constraining roles played by each, the study did not access data directly from these people. The scope of the study in looking across the sector entailed having to narrow the participants. Although the data from the EdTech participants provided a good understanding of how EdTech uptake emerged from multiple mechanisms, but this remains a shortcoming of the study.

9.7 Recommendations

The nature of the discipline itself was seen to condition the extent of uptake of educational technology and the types of educational technology that were used. There is a need for studies that look at this relationship in more depth. In particular, perhaps where educational technology is only used to a limited extent, it would be worth exploring the nature of the discipline which might be constraining the use of educational technology.

Additionally, having provided a detailed analysis of the T1 that conditioned the uptake of educational technology before COVID-19, it would be very useful to now have a follow-up study that explores the current use of educational technology across South Africa. Such a study could look back at how the enabling and constraining mechanisms that were identified in this study played out in the post-COVID-19 era.

Some direct recommendations also emerged from findings of the study. In particular, the finding that for educational technology to be used in pedagogically sensible ways, educational technology staff would need to have sufficient institutional support. They would also need to have educational expertise. As a result, there is a need for deliberations in institutions possibly through institutional strategies, policies and guidelines that would help academics consider the use of educational technology as being something that needed to be educationally sound and not just understood in terms of technical use.

It is also recommended that EdTech staff work together more. Czerniewicz (2020) provides an excellent example of cross-sector collaboration and support. Another example is the UP2U community of practice, which could be extended to include all universities. Ideally, it would continue to grow its current work of establishing conversations around the nature of educational technology work. This might include deliberations of what is the most appropriate terminology for such people in South Africa, given the confusion around different terms being used in different ways in different institutions.

9.8 Significance of the study

As indicated in this chapter, the study is significant in terms of the scope in that it is the first study to provide a broad understanding of the use of educational technology across the sector. It is similarly significant in that it is the first study that I know of that has used critical realism and social realism to move beyond describing the status quo to interrogating what mechanisms have allowed the uptake of EdTech to emerge as it has. Although the status quo has shifted enormously, owing to COVID-19, this study is also of importance in that it provides insight into the prevailing conditions in which emergency remote teaching had to be implemented. This study thus prevents the making of broad generalisations about what happened during COVID-19 across the sector. Such accounts fail to take into account the differentiated nature of educational technology uptake in institutions and fail to understand the contextual mechanisms at play.

9.9 Conclusion

In conclusion, EdTech uptake is conditioned by structural and cultural mechanisms at each institution. It was notable that socio-cultural issues had some ability to enable and constrain how academics used educational technologies. To ensure institutional EdTech uptake, there is a need to address strategies and policies at an institution-wide level. Establishing an institutional framework for educational technologies is regarded as the most important factor for universities to succeed in EdTech implementation (Browne & Beetham, 2010). A need for institutions to undergo some cultural and structural renewal for the implementation of EdTechs as part of the university's curriculum and strategy seems vital (Castells, 2009; Browne & Beetham, 2010). All stakeholders including students are suggested to form part of this technological change (Castells, 2009). However, educational technology is not a panacea for issues of poor retention and throughput but it can afford opportunities for meaningful and engaged learning. As the technology advances, so the ways in which it could augment and deepen learning advances too. However, as this study has shown, technology can only bring about pedagogical benefits if it is accessible to all stakeholders and is designed and implemented with the goal of epistemological access.

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Appendix A: Ethical Clearance from Home Institution

APPENDIX A Ethical Approval Application

RU FACULTY OF EDUCATION: ETHICAL APPROVAL APPLICATION

IMPORTANT: The following form needs to be completed by the researcher and submitted with their research proposal to the Education Higher Degrees Committee. The details to which this form relates should also be evident in the text of the proposal.

GENERAL PARTICULARS: PhD

TITLE OF RESEARCH: The enablements and constraints in the uptake of educational technologies for teaching and learning in differentiated institutions

DEPARTMENT/INSTITUTE: CHERTL **DATE:** 15 October 2015

RESEARCHER: Nomathemba Ngcobo **SUPERVISOR/S:** Prof. Sioux McKenna & Dr Marcelle Harran

Respect and dignity

Participants will, throughout this study, be respected and treated with dignity. The purpose and full details relating to this study will be communicated with all relevant institutions and individuals prior to any data collection process. To conceal institutional identity, names shall not be mentioned in the study, letter symbols or pseudonyms will be used to refer to particular institutions. The privacy and confidentiality of participants shall, at all times, be ensured.

Transparency and honesty

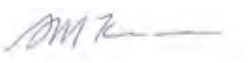
The online survey will be created specifically to maintain anonymity of participants, therefore, online questionnaires will be completed anonymously. All information concerning the personal identities of respondents collected from the study will be treated as confidential. Results of the research will only be documented in a combined format to protect the identity of the individual participants and institutions. Data quotes will be ascribed to neither individual participant nor institution. All results will be stored according to Rhodes University's ethics policy during and after completion of the research. Informed consent will be issued to all participants prior to data capturing and the rights of individual to refuse to participate or withdraw from participation shall be communicated and respected.

Accountability and responsibility

Access to data collected from each institution and participants shall not be shared with anyone besides the study supervisors. It will be my responsibility as a researcher to obtain any internal ethical clearance, should institutions (e-Learning support units) require such. Participants shall be given an opportunity to proofread their transcripts. Any direct quotation (from individuals) in the findings will be used as such that the correct referencing practice is maintained.

Integrity and academic professionalism

Integrity and academic professionalism shall be maintained through anonymous and unbiased reporting. Any publications that may arise from this study shall not contain an institution or participant's identity. The findings, recommendations and conclusions of the study will be reported to using the correct protocols (written thesis, conferences and journals).

Signature (researcher):  Signature (supervisor): 

Date: **28 .09. 2015** Place: **Pretoria** Date: __15 October 2015 Place: _Grahamstown

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Appendix B: Informed consent

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix C: Introduction to Survey

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix D: Survey

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix F: Interview Follow-up email

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix G: Interview Guide

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix H: Ethical Clearance from all participating universities

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc

Appendix I: Confidentiality agreement with transcriber

In order to reduce the file size, the appendices are not included in this version. However they can be found online here:

https://tinyurl.com/NomaDoc