

INVESTIGATING THE CHARACTERISTICS OF THE TWENTY-FIRST CENTURY
SOUTH AFRICAN SECONDARY SCHOOL LEARNING ENVIRONMENT THAT
PRODUCE RICH LEARNING EXPERIENCES

A thesis submitted in fulfilment of the requirements of the degree of

DOCTOR OF PHILOSOPHY

SCHOOL OF EDUCATION

UNIVERSITY OF THE WITWATERSRAND

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ABSTRACT

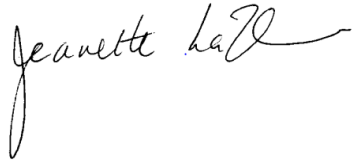
This mixed methods study set out to investigate the characteristics of a 21st century South African secondary school learning environment that provide rich learning experiences. It was framed through a pragmatic lens and articulates the view of learning as an active, social process. This research was conceptualised around teachers' appropriation of digital technologies and teachers' pedagogical approaches. The examination of their pedagogical strategies included the opportunities to harness learners' epistemological diversity, which speaks to their lived experiences, and ways of making meaning in society. Teachers' appropriation of digital technologies was analysed using Hokanson and Hooper's continuum of media use from representative to generative use, which reflects the extent to which they exploited their digital affordances to enhance and transform learning. Cope and Kalantzis' Learning by Design knowledge processes along with the modes of interaction in Anderson's interaction theorem (teacher-student, student-student and student-content) were used to examine teachers' pedagogical approaches. This study extended the theorem by adding and using teacher-student-content interaction as another mode of interaction.

The research setting for this investigation was 10 English and History classrooms in three private schools and two former Model C schools. The study used a convergent mixed methods design that combined quantitative and qualitative data sources with the latter being prioritised. Qualitative and quantitative data collection occurred concurrently and included detailed classroom observations, semi-structured interviews, and a questionnaire survey. The findings revealed that teachers mainly used digital technologies in the representative sense with minimal evidence of their generative use and did not exploit the surfeit of digital affordances. Teachers whose pedagogical strategies included a blend of knowledge processes and modes of interaction demonstrated more transformative pedagogical strategies. The main contribution of the study is a conceptual model of the 21st century secondary school learning environment that speaks to both technology-rich and technology-constrained environments.

Key terms: digital affordances; digital technologies; epistemological diversity; interaction equivalency theorem; knowledge processes; learning environment; rich learning experiences.

DECLARATION

I declare that this thesis, which is submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, is my own unaided work. Furthermore, it has not been submitted before for any other degree or examination at any other university.



.....

Jeanette Andrea La Fleur

ACKNOWLEDGEMENTS

I acknowledge the contribution of my supervisor, Dr Reuben Dlamini, who gave me the space to grow academically. I enjoyed our insightful conversations that opened new windows into learning for me. Thank you for encouraging me to move beyond qualitative methods; I am now a mixed methods convert.

My sincere gratitude to the School of Education and everyone involved in planning and organising the informative PhD seminar weekends and workshops. Special thanks to Matsie Mabeta for your kindness, professionalism and for always being willing to help students.

To the principals, the English and History teachers, the Heads of Information Technology/Innovation and the learners at the secondary schools involved in the study: Thank you for the participating in this research and for welcoming me into your learning spaces.

I am especially grateful to my dear friends Dr Liepollo Ntlhakana, Dr Dawn Lyken-Segosebe and Professor Harold Campbell for their invaluable help, guidance and wisdom throughout this PhD process.

As I complete this work, I reflect on God's faithfulness to me and my family. God has been the invisible force guiding me through the vicissitudes of this process. I am also fortunate to have family and friends whose prayers and support sustained me throughout this period. To the greater glory of God! AMDG!

DEDICATION

I dedicate this work to my family from whom I received unwavering support and encouragement. To my husband Warren, whose passion for learning is infectious and from whom I learnt a great deal. Thanks for your patience, your wisdom and for always offering practical advice when needed. To my daughters Maya and Eryn, thank you for your help and understanding and for messages like “keep going, you can do it” just when I needed it. It was also great to have learning companions, particularly during lockdown.

I also dedicate this work to my mom Frances and late dad Winston Semple, former educators, who were passionate about teaching and learning and devoted their lives to providing rich learning experiences to countless students. Thank you for passing on your passion for education to me.

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LIST OF ACRONYMS

BYOD	Bring Your Own Device
CAPS	Curriculum Assessment Policy Statement
CAT	Computer Application Technology
DBE	Department of Basic Education
DoE	Department of Education
ICTs	Information and Communications Technologies
IT	Information Technology
IWB	Interactive Whiteboard
OECD	Organisation for Economic Cooperation and Development
PLC	Professional Learning Community
SA	South Africa
SAMR	Substitution Augmentation Modification Redistribution
UNESCO	United Nations Educational, Scientific and Cultural Organisation
US	United States of America

CHAPTER 1: INTRODUCTION

Education is on the brink of being transformed through learning technologies; however, it has been on that brink for some decades now ... It is time we moved education beyond the brink of being transformed, to let it become what it wants to be. (Laurillard, 2008, p. 1)

1.1 INTRODUCTION

From Papert's (1993) argument for the "rethinking of schooling in the age of the computer" to Dede's (2011) call for a transformation of the industrial-era schooling system, there have been continuous appeals for the reconceptualisation of schooling. The above statement by Laurillard (2008) echoes the pleas for change made by academics, educators and researchers that have become more urgent with the proliferation of digital technologies in society and more recently, the disruptions to schooling caused by the recent pandemic. Yet, despite widespread technological transformations in business and in society as a whole, the education sector has perhaps been the slowest to transform. Instead, the approach has been to innovate "within the structure of industrial-era schools" or to automate "conventional classroom practices" (Dede, 2011, p. 5). Papert (1993) noted that while there have been some changes in schooling, these have not been significant enough to change its nature. He suggested that if a teacher from the past were to enter one of our current classrooms, though they may notice a few changes in classroom objects and techniques, they would be able to teach quite easily given the lack of transformation within the classroom. This perspective was shared in 1993, but it is still relevant to many school contexts today.

Pahl and Rowsell (2005) argued that while schools in the industrial era catered to "monocultural print children" who were expected to "reproduce relatively static and stable disciplinary knowledge", the advent of digital technologies meant they have had to accommodate children from multimodal environments (p. xii). Consequently, teachers are expected to address "a species of *epistemological diversity* where students now bring to the classroom complex, multiple and blended background knowledges, identities and discourses" (p. xiii; italics in original text).

The mid to late 20th century also witnessed an epistemological shift in conceptions of learning from instructivist views about teaching and learning to constructivism (Hokanson & Hooper,

2000), which signalled a shift from passive, teacher-led instruction to learner-centred pedagogies. Although the change in learning theories have been reflected in many curriculum policies, including the South African outcomes-based curriculum and its current policy iteration, it has not resulted in any significant change to the pedagogical approaches of many teachers.

The late 20th century also witnessed the birth of the new South Africa after decades of apartheid. While it has always been a multicultural and multilingual society, there was the systematic delegitimisation of the identities and cultures of Black South Africans, which extended into the classroom. Paris and Alim (2014, p. 87) referred to this approach to teaching and learning as deficit approaches that view “the languages and literacies and cultural ways of marginalised people as deficiencies to be overcome”. Newfield and Stein (cited in Cope & Kalantzis, 2000) described this model of literacy that was imposed on the country as monolithic and autonomous. According to Street (2003), an autonomous approach imposes Western conceptions of literacy on other cultures or within a country, those of one class or other groups impose it onto others. One of the goals of the new democratic government was therefore to redress the previous deficit approaches to teaching and learning with a new approach that would provide “equity, access and looking towards future employment and empowerment” (Newfield & Stein, cited in Cope & Kalantzis, 2000, p. 293). In the democratisation process, schools were desegregated to make them inclusive. Nevertheless, the process of desegregation has been described as assimilationist because learners were being “assimilated into the host school culture” (Carrim, 2013, p. 41). As such, their epistemological diversity is still not being acknowledged.

1.2 BACKGROUND TO THE STUDY

The democratisation of the South African society coincided with a period of significant global change as new information technologies were beginning to impact society (Christie, 2008). South Africa was not excluded from their influence and the result has been the prevalence of new forms of emerging technologies such as mobile phones and the internet, which have created “new spaces for imagination and activity and new ways of thinking about the world” (Christie, 2008, p. 59).

Not only was the new South African government grappling with the transition to democracy with a large unskilled and uneducated population, it also had to deal with great technological innovations that had begun to disrupt every aspect of society. One of the problems related to a large digital divide between those who had access to digital technologies and a large section of the population who had no access (Department of Education, 2004). The recent increase in mobile phone use, access to the internet and other forms of digital technologies meant that a larger number of people are beginning to have digital access.

The education sector could not ignore the technological disruptions occurring in society and as stated in the Department of Basic Education's Action Plan to 2019 (2015b), "an education without information and communications technologies (ICTs) is rapidly becoming an incomplete education" (p.17). Acknowledging the importance of integrating these new forms of technologies for teaching and learning, the DoE and private independent schools have invested heavily in the procurement of hardware and software for schools. The most recent technological investments made by government include the provision of laptops, interactive whiteboards (IWBs) and data projectors as part of the Smart classroom projects in the Western Cape and Gauteng provinces.

In 2004, the South African government published its e-education policy (Department of Education, 2004), to guide the integration of ICTs into teaching and learning as well as to facilitate the transformation of the education sector. It was envisaged that this would help the country "leapfrog into the new century bypassing the unnecessary adoption cycle" (Department of Education, 2004, 1.17). Its goal was that every learner in the general education and further education training bands would be able to use ICTs confidently and creatively by 2013. Key stated principles, like the development of higher-order thinking skills, reflected those articulated in its National Curriculum Statements. It was therefore the view that ICTs could advance problem-solving, creative thinking and other higher-order thinking skills.

E-education was also seen as a resource that would help reorganise teaching and learning (Department of Education, 2004), enabling teachers to transform their pedagogical approaches from teacher-centred to learner-centred approaches. Phase 3 of the policy expected that ICTs would be integrated at all levels of the education system. However, despite the policy rhetoric, several its intended outcomes have not been achieved and the anticipated changes to the

teaching and learning environment have not yet occurred (Vandeyar, 2015). The DBE's (2015b) Action Plan to 2019 also acknowledged the lack of technological pedagogical transformation in schools, highlighting "weaknesses in the system when it comes to the adoption of new technologies, not only regarding administration but especially with respect to the teaching and learning process" (p. 14). This suggests that the challenge "is not getting appropriate technologies into classrooms but getting those in classrooms prepared to use those technologies and facilitating greater willingness to incorporate changing technologies as they emerge" (Buckenmeyer, 2010, p. 27). The disruptions to teaching and learning caused by the recent global pandemic have further highlighted the deficiencies in the education system including inequitable access to digital technologies. This has accelerated calls for the transformation of teaching and learning (Fataar & Norodien-Fataar, 2021).

1.3 PROBLEM STATEMENT AND RATIONALE

Eighteen years after the e-education policy was published and almost 10 years after the policy goals were projected to be realised, the expected e-education transformation has not occurred. According to Dlamini and Nkambule (2019), the uptake of ICT in schools has been slow despite the significant investments made by government. They added that this reflects a disparity between schools' access to technologies and teachers' readiness to integrate them into their classroom practices. Findings from local studies, which are examined in greater detail in Chapter 3, also confirmed a gap between policy expectations and teachers' practices with technology (Chigona, 2015; Du Plessis & Webb, 2012; Nkula & Krauss, 2014; Padayachee, 2017; Wilson-Strydom et al., 2005). These studies highlighted a general lack of pedagogical transformation due to issues such as inadequate teacher preparation, a lack of support, continued lack of digital access in some areas, and low teacher self-efficacy and beliefs. Tarling and Ng'ambi (2016) argued that efforts at developing teachers' ability to teach with digital technologies have been piecemeal and erratic. These studies therefore concluded that digital technologies continue to be used to supplement teaching, and more significantly, teachers have not moved away from traditional teaching approaches. Yet, there continues to be the misguided view that providing schools with expensive equipment equates to quality teaching and learning and leads to improvements in

teachers' pedagogical strategies. Hennessy et al. (2010) averred that while this is the first and perhaps easiest step in creating change in the classroom, access to digital technologies does not always translate to their effective use. Technologies therefore "do not embody new pedagogy, but it is the way in which (they) are integrated to support pedagogical goals that make them effective" (Kervin et al., 2013, p. 136).

Tarling and Ng'ambi (2016) examined teachers' pedagogical practices in detail and posited that one of the biggest impediments to educational transformation is changing teachers' 20th century pedagogical approaches to those that are relevant for the 21st century. It is evident that traditional instructional methods are continuously being applied to the new technologies with disappointing results (Hokanson & Hooper, 2000).

Important decisions about investments in expensive digital technologies for schools and the integration of ICTs in the classroom have been made and continue to be made with minimal sound empirical evidence to guide the process (Dlamini & Coleman, 2017). This is despite the statement in the e-education policy (Department of Education, 2004) that ICT interventions should be informed by research. The action plan (Department of Basic Education, 2015b) also highlighted the importance of empirical data to guide government's interventions and acknowledged that "strategy and planning need to be guided by much better information on the current shape and size of e-education in schools and on whether existing initiatives are having the intended results" (p.19). Additionally, the e-education policy (Department of Education, 2004) strongly emphasises ICTs as a means of changing teachers' pedagogical strategies and transforming their practices. However, previous research highlighted that poor pedagogical approaches are an impediment to quality teaching and learning. According to Ng'ambi et al. (2013, cited in, Kilfoil, 2015, p. 3),

the primary consideration for learning with technologies should therefore start from an outcome of accomplishing meaningful learning and work backwards, asking pedagogical questions, interrogating strategies of teaching and evaluating the affordances of technologies to support this end.

With the adoption of new digital technologies into classrooms, educators have effectively transplanted existing instructional methods onto new technologies without changing the traditional classroom structure (Hokanson & Hooper, 2000, p. 543).

Given the lack of transformation in teachers' practices, particularly using digital technologies and the persistence of teacher-centred pedagogies in schools, it is necessary to interrogate teachers' pedagogical approaches along with their appropriation of digital technologies to be able to inform strategies for change. This study therefore chose to examine teachers' pedagogical practices while investigating how they have appropriated digital technologies by harnessing their affordances to enhance teaching and learning.

This study focused on better resourced private and former Model C government secondary schools with the general assumption that teachers in schools with greater access to digital technologies and opportunities for training integrate technologies more effectively into their classroom practices. Hence, the findings may provide useful insights into the features of the contemporary classroom.

The next sections outline the purpose of the study and the research questions.

1.4 PURPOSE OF THE STUDY

Selwyn (2017) posited that a key point in the debate about how education is being shaped by digital technologies is the need to differentiate between rhetoric and reality. This means that it is necessary to move beyond questions about how technology could be used and ask questions about how technologies are implemented in practice. This requires an examination of "the state-of-the-actual" (Selwyn, 2017, p.vii). The purpose of this study was therefore to investigate the state-of-the-actual regarding teachers' appropriation of digital technologies and their pedagogical strategies including how these approaches harness learners' epistemological diversity. The findings from this investigation helped to delineate the characteristics of the 21st century South African secondary school learning environment and inform the creation of a model of the contemporary classroom that is particularly relevant to the local context.

1.5 RESEARCH QUESTIONS

The main research question that this study answers is:

- What are the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences?

The sub-questions that helped to answer the main research question are:

1. In which ways have digital technologies been appropriated within the classroom to transform teaching and learning?
- 2.a Which pedagogical strategies do teachers need to employ in order to produce rich learning experiences in the contemporary learning environment?
- 2.b How is the epistemological diversity of learners being privileged through teachers' pedagogical choices?

1.6 MAPPING OUT THE THESIS

The thesis is set out as follows:

- **Chapter 1:** This chapter introduces the study and provides a background that explains the research context. This is followed by the problem statement and rationale. The purpose of the study is then articulated along with the research questions.
- **Chapter 2:** The conceptual framework and theoretical foundation are presented in this chapter and includes the orientations of media use, the interaction equivalency theorem and learning by design framework. The different theories that influenced the various frameworks are outlined in the theoretical foundation.
- **Chapter 3:** This chapter synthesises key arguments and research in the field and examines some of the relevant national policies. It also examines local studies that have been conducted in the field. The concept of a learning environment is first defined, then perspectives on the future classroom are looked at before describing in detail the different frameworks used in the analysis of research findings. Literature on affordances in general and digital technology affordances is also presented.

- **Chapter 4:** This chapter outlines the research methodology and design for the study and describes information about the research sites, participants and methods of data collection and analysis.
- **Chapter 5:** This chapter presents qualitative findings describing teachers' appropriation of digital technologies and their pedagogical approaches. These are drawn from semi-structured interview data as well as classroom observation data for each of the five schools. Each section begins with a detailed description of the school context and a general account of the types and use of digital technologies in each context. Teachers' perceptions of the 21st century classroom are presented at the end of each school section. The chapter ends with a summary map of teachers' appropriation of digital technologies and their pedagogical strategies.
- **Chapter 6:** The quantitative data collected using the 12-point questionnaire are presented in this chapter. Descriptive statistics are used, and the findings are presented using figures, tables and brief narratives.
- **Chapter 7:** The results from the qualitative and quantitative findings are merged, and areas of convergence and divergence are looked at. Most importantly, the process of answering the research questions begins here.
- **Chapter 8:** This is the discussion chapter in which the two sub-questions and the main research question are answered. This chapter therefore presents a detailed account of teachers' practices.
- **Chapter 9:** The chapter concludes with the contribution of the study, including a description of the model of the 21st century secondary school learning environment that was created. General recommendations as well as recommendations for future research are presented. The chapter ends with an explanation of the limitations of the study and general reflections on the lessons learnt during the research process.

The next chapter outlines the conceptual framework for the study and explains key aspects of the learning theories that constitute the theoretical foundation.

CHAPTER 2: CONCEPTUAL FRAMEWORK AND THEORETICAL FOUNDATION

2.1 INTRODUCTION

This chapter presents the conceptual framework and theoretical foundation for this study, whose aim was to investigate the characteristics of the 21st century South African secondary school learning environment that produces rich learning experiences.

2.2 CONCEPTUAL FRAMEWORK

This study was conceptualised using a pragmatic lens. This worldview was founded on the works of Charles Sanders Pierce, William James and John Dewey (Hall, 2013; Johnson & Onwuegbuzie, 2004) and espouses a pluralistic approach to inquiry (Creswell & Plano Clark, 2018; Johnson & Onwuegbuzie, 2004). In this regard, theoretical perspectives that seem to conflict may be deemed appropriate for making sense of the world (Johnson & Onwuegbuzie, 2004). At the center of Deweyan pragmatism is the focus on intelligent action which starts with identification of the problem (Hall, 2013). The purpose of inquiry is thus to find the best method for solving the problems identified (Dewey, 1938, cited in Hall, 2013). This study applied a blend of frameworks to conceptualise and analyse teachers' appropriation of digital technologies and their pedagogical practices. These frameworks embrace transformative pedagogical approaches that privilege active learner participation in the learning process.

Hokanson and Hooper's (2000) orientations of computer use were used to understand teachers' appropriation of digital technologies while Anderson's (2003a) interaction equivalency theorem combined with the knowledge processes of Cope and Kalantzis' (2015) Learning by Design were used to interpret teachers' pedagogical practices. Hokanson and Hooper's (2000) and Anderson's (2003a) frameworks were based on cognitive constructivist perspectives on teaching and learning. However, Cope and Kalantzis (2015) and Cope and Kalantzis (2020) proposed a reflexive or transformative pedagogy which moves beyond (Piaget's) constructivism and reflects the view

that learning is a social process. A pedagogy of multiliteracies on which Learning by Design is founded, was influenced by cognitive and social perceptions of teaching and learning. It embraces the view that learning is “embodied, situated and social” (Cazden et al., 1996, p.20) suggesting that human knowledge is embedded in social, material and cultural contexts.

By combining the three frameworks, this study underscores the view that learning is an active, social and situated process. This view also recognises that learners construct their own knowledge and understandings within sociocultural settings. Teachers’ pedagogical strategies must therefore consider learners’ particular social contexts by harnessing the diverse semiotic resources they bring to the classroom and engage with the multiple ways in which they come to know in the world (Cope & Kalantzis, 2009, 2015; McKinney, 2011; Pahl & Rowsell, 2005).

Hokanson and Hooper’s (2000) orientations of computer use map technology use along a continuum, from representative use to generative use. The representative use of media reflects traditional pedagogical approaches and refers to the use of technology mainly to transmit information with no fundamental change to the task. In the generative sense technologies are used for knowledge creation and signals transformative practices. Representative use indicates a focus on learning *from* computers and generative use focuses on learning *with* computers (Hokanson & Hooper, 2004).

Teachers whose practice provides multiple opportunities to learn *with* digital technologies exploit their many digital affordances, and in this way, extend learning beyond a single teacher or resource (Tarling & Ng’ambi, 2016). According to Hammond (2010), affordances provide a unique look into the use of ICT in education because of the emphasis on possibilities for action. Consequently, in analysing teachers’ appropriation of digital technologies, this study also examined how they exploited the many affordances. Cope and Kalantzis’ (2017) digital affordances, and to a lesser extent Conole and Dyke’s (2004) affordances, were used in this respect.

As part of a broader theory of online learning, Anderson (2003a; 2003b; 2004) proposed different modes of interaction in distance education to ‘get the mix right’ between independent study and interactive learning strategies. The term interaction is used to describe face-to-face classroom

learning as well as mediated synchronous and asynchronous engagements afforded by digital technologies.

Though initially developed to examine interactions in distance education, the interaction equivalency theorem was deemed appropriate to study the 21st century secondary school learning environment as it provides a model for examining patterns of interaction involving learners, teachers, resources and content. This study applied the following modes: teacher-student; student-student; student-content as proposed in Anderson (2003a; 2003b; 2004). Teacher-student-content was added by this study as an important mode of interaction that is distinct from teacher-student interaction since it was felt that such a distinction was necessary particularly in a face-to-face environment. While teacher-student interaction indicates a more teacher-centred engagement, teacher-student-content interaction describes joint meaning-making and greater collaboration between the teacher and learners with the teacher playing a facilitative role.

The Learning by Design framework has its roots in the New London Group's Pedagogy of Multiliteracies (Cope & Kalantzis, 2000; New London Group, 1996). Cope and Kalantzis (2015) explained that Learning by Design, which is an epistemologically based framework, took on a "larger pedagogical agenda" and "has become a pedagogy of knowledge representation for all subject areas" (p. 16). As such, the four pedagogical orientations of the multiliteracies pedagogy framework (situated practice, overt instruction, critical framing and transformed practice) were reframed into the following knowledge processes: experiencing; conceptualising; analysing and applying. These are described as pedagogical moves from which a teacher needs to draw when designing learning experiences (Cope & Kalantzis, 2015). They posited that the strength of a teacher's pedagogical strategies lay in his or her ability to weave between different knowledge processes.

The knowledge process of experiencing speaks to the privileging of learners' interests and their ways of knowing and interacting with the world. It is within this particular knowledge process that learners' epistemological diversity (Pahl & Rowsell, 2005) is conceptualised and examined. In analysing teachers' pedagogical practices, this study also examined how the diverse perspectives, experiences and interests of learners are privileged in the pedagogical choices they

make, including the texts chosen. Such a perspective also recognises that learners are not homogenous, with a singular identity. Harnessing learners' diverse ways of making meaning involves infusing lessons with multimodal texts, including digital technologies. It is also evidenced in the use of examples from local contexts as well as the enabling of learners' participative agency and providing opportunities for them to reflect on their practices while applying their knowledge in real-world contexts (Kalantzis & Cope, 2010; Janks, 2013). It is therefore in the privileging of their epistemological diversity that classrooms could become inclusive spaces where learners do not have to assimilate to the host school culture. However, this research recognises that this is a very narrow focus since the notion of acknowledging learners' epistemological diversity and foregrounding difference in a South African setting extend to complex issues of language and identity, which is beyond the scope of the study.

This study set out to understand how teachers' appropriation of digital technologies and their pedagogical approaches contributed to rich learning experiences. Based on the frameworks around which it was conceptualised, such experiences refer to the intentional use of digital technologies by teachers as part of their pedagogical strategies by harnessing their digital affordances. In this way, technology is used both in the representative and generative sense but with a greater emphasis on its transformative use for the creation of knowledge. Rich learning experiences are also reflected in teachers' pedagogical repertoires and the privileging of learners' epistemological diversity.

The next section discusses the different theories that have influenced the frameworks used in the study.

2.3 THEORETICAL FOUNDATION OF THE STUDY

The view that learners are active participants in the learning process signals an epistemological and ontological shift away from early psychological theories of learning and cognition. This paradigm shift marked a change from objectivist assumptions about reality, where reality was viewed as "external to the knower" (Cooper, 1993), to a subjectivist view of reality, which "resides in the mind of each knower, who interprets the external world according to his or her own experiences, beliefs and knowledge" (Jonassen, 1996, p. 12). Recent constructivist

perspectives of learning reflect a 'social turn' which dominated the field of educational technology in the 1980s and 1990s (Selwyn, 2017).

Behaviourism of the early 1900s treats learning as a biological function realised through stimulus and response. The individual is viewed as a passive recipient of knowledge. The use of digital machines in education and technology-based instruction can be traced back to Skinner's teaching machines (Selwyn, 2017). Instruction is based on specific tasks developing stimulus-response behaviours that are then shaped towards what Cooper (1993, p.12) referred to as a "desired terminal or final behavior". Feedback is thus provided as reinforcement. Early forms of computer-assisted instruction were based on behaviourist principles through drill-and-practice computer programmes (Selwyn, 2017). Technology programmes using behaviourist principles were criticised as being reductionist and fragmented focusing on low-level skills (Cooper, 1993).

Cognitivism which followed behaviourism, focuses on individual mental processes and likens the human mind to that of a computer (Selwyn, 2017). The learner whose mind is treated as an information processor takes in information, processes it cognitively and then stores it in their memory (Cooper, 1993). The role of the teacher is to provide the input the learner processes. Bruner (1996, p.1) criticised this "well-formedness" and "computational view" of learning where information is seen as finite, coded and unambiguous and "is inscribed, sorted, stored, collated, retrieved and generally managed".

For constructivists, knowledge is constructed by individuals based on their developmental level, their contexts and beliefs, their sociocultural background and their prior experiences with learning (Dede, 2008; Selwyn, 2017). Learning is thus viewed as an iterative process (Selwyn, 2017) with learners being seen as "intellectually generative individuals" (Yilmaz, 2008). Constructivism thus emphasises the active construction of knowledge by the individual.

However, it is not a unified theory and reflects multiple perspectives on cognitive development and learning (Yilmaz, 2008). The two strands of constructivism that have been associated with teaching and learning are cognitive or psychological constructivism which originated with Jean Piaget and social constructivism which is said to have its roots in the works of Lev Vygotsky.

Piaget's theory of cognitive development conceptualises learning and development as biological processes. Learning is viewed as an operation described as an interiorized action which is provoked by situations or by a teacher (Piaget, 1964). He rejected objectivist perceptions of reality arguing that "knowledge is not a copy of reality" (p.176). Instead,

(t)o know an object, to know an event, is not simply to look at it and make a mental copy or image of it. To know an object is to act on it. To know is to modify, to transform the object and to understand the process of this transformation, and, as a consequence, to understand the way the object is constructed. (Piaget, 1964, p.176).

During the active construction of knowledge, a child's schemas go through the process of assimilation, accommodation and adaptation where new information is assimilated into their existing structures so that it fits with their current understandings. Any information that does not fit has to be accommodated and adapted to fit until a new level of equilibration is reached (Piaget, 1964).

Although Piaget emphasised individual construction of knowledge, he did not discount "the co-equal role of the social world in the construction of knowledge" (Cole & Wertsch, 1996, p.250). Jonassen (1996) highlighted this perspective arguing that the social negotiation of meaning "enables us to construct common interpretations of events and objects (p.12). In this sense, collaboration is viewed as important for learning. Jonassen viewed computers and technology as vital knowledge construction tools and referred to them as mindtools that extend cognitive functioning. Computers as mindtools therefore support authentic learning in meaningful contexts, reflection, the collaborative construction of knowledge and the provision of real-world settings for learning (Jonassen, 1996). Hokanson and Hooper's (2000) continuum of technology use referred to computers as cognitive media arguing that their use facilitates the mental construction of knowledge and enhance the cognitive process.

The notion of deep and meaningful learning which is linked to Anderson's (2003a) interaction equivalency theorem is also based on Piaget's notion of constructivism and emphasises active, constructive, authentic and collaborative learning (Mystakidis et al., 2019). Dunlap et al. (2007) argued that student-content interaction supports cognitive processing and hence, deep and

meaningful learning. Anderson's (2004) theory of online learning highlights collaborative construction which facilitates cognitive learning through individual discovery. Anderson (2004) used Vygotsky's concept of social cognition to understand how learners collaborate online to create new knowledge. Scaffolding by the teacher is seen as an important way for learners to "grow their own knowledge and discipline-centered discoveries" (Anderson, 2004, p.37).

Vygotsky, with whom social constructivism is generally associated, emphasised the social origins of individual mental functioning and averred that a mental function is first social before becoming an internal function, that is, it is originally an intermental function and then, an intramental function (Vygotsky, 1978). Even when an individual is acting alone, the process of cognition is still viewed as social since it incorporates cultural tools that evolved and are organised socially (Wertsch & Tulviste, 1992). Learning thus creates the zone of proximal development as it "awakens a variety of internal developmental processes that are able to operate only when a child is interacting with people in his environment and in cooperation with his peers" (Vygotsky, 1978, p.90). Higher mental functions are culturally mediated by signs, symbols and tools. These "artifacts that enter into human psychological functions are themselves culturally, historically and institutionally situated" (Cole & Wertsch, 1996, p.252). The argument that psychological functions first occur on the social plane highlights Vygotsky's view that development lags behind learning. He also argued for the primacy of language over thought. On the contrary, Piaget (1964) averred that thought precedes language and that learning is subordinate to development.

However, Moll (2002) posited that although there is the tendency to distinguish between the different facets of constructivism, at its core is the proposition that "new knowledge arises in children out of real developmental mechanisms, some of which are social and some natural, and on the basis of activity that is simultaneously cultural and individual" (p.28).

Vygotsky's perspectives on the social origins of human cognition also laid the foundation for sociocultural learning theories. Such theories frame learning as a "fundamentally social experience" (Crook, 1994). Thus, learning is not a "one person act" (Lave, 1991) but occurs within a sociocultural system in which "learners use various tools and multiple forms of interaction to create collective activity supported by technology affordances" (McLoughlin & Lee, 2007, p. 667). Sutherland et al. (2004, p. 415) similarly stated that "any technological tool has been developed

within a particular sociocultural setting and carries with it, the provenance of this culture". However, tools are constantly being redesigned as their use in certain situations evolve. A recent example of this perspective is the social applications 'Zoom' and 'Microsoft Teams' which were first developed for business. They have been recently redesigned for educational contexts following their use in emergency remote learning because of the disruptions to education caused by the recent Covid-19 pandemic.

Apart from tool mediation, sociocultural theories emphasise participatory engagement and social context as being relevant to the way in which educational technologies are designed and used (Crook, 2001). He argued that sociocultural theory is interested in how individuals appropriate new and emerging technologies as a means of mediation. In terms of participatory engagement, Crook (2001) made the case for new technologies, including software, that encourage more authentic participation and interactive experiences. Because of its plethora of affordances, the appropriation of digital technologies in the classroom offers the opportunity "to augment or distribute intelligence" (Crook, 2001, p. 33) and provides more opportunities for participatory learning. Collaboration and interaction are thus fundamental to social learning approaches.

Sociocultural theories of learning equally emphasise the notion that learning is situated. Lave and Wenger (1991) argued that learning best occurs in authentic, real-life situations as a product of context, activity and culture. As such, schools, and by extension the classroom, can never be considered "culturally free standing" (Bruner, 1996) as teachers and learners operate within a specific classroom culture that is influenced by various factors, such as the national education curricula and policies, referred to as top-down influences (Sutherland et al., 2004). Bottom-up influences include teachers' and learners' histories of learning and their beliefs and teachers' pedagogical approaches (Sutherland et al., 2004). They added that learners bring to the classroom their own histories of learning that are linked to their out-of-school practices. Consequently, the contexts of each of the participating schools in this study are significant to the analysis of teachers' classroom practices and their appropriation of digital technologies.

Kalantzis and Cope (2020) argued that constructivism and connectivism alone do not prepare learners adequately in the digital era and thus proposed a reflexive pedagogy around which Learning by Design and the knowledge processes are framed. Connectivism is a very recent

learning theory that describes teaching and learning in the digital age, in particular e-learning (Siemens, 2005). According to Downes (2012, p. 9), “connectivism is the thesis that knowledge is distributed across a network of connections and therefore, that learning consists of the ability to construct and traverse those networks”. Hence, the learning community is conceptualised as a ‘node’ and part of a larger network. A network is comprised of at least two interconnected nodes (Goldie, 2016). The individual learner is no longer fully in control of their learning since knowledge now resides in networks and non-human objects (Siemens, 2005). Knowledge is thus a fluid and dynamic process (Goldie, 2016) that describes connections between objects (Downes, 2012). However, connectivism has been criticised for lacking rigour (Bell, 2011) while Kalantzis and Cope (2020) argued that it lacks pedagogical scaffolds which remain the responsibility of the teacher.

Reflexive pedagogy represents a change from didactic pedagogy to reflexive pedagogy. It draws on the works on Lev Vygotsky (Kalantzis & Cope, 2020) whom they argued was not a constructivist and did not use the concept to describe his psychology. While pointing out that the concept of constructivism did not appear in any of Vygotsky’s translated works, Moll (2002) argued that he was as much a constructivist as was Piaget. He postulated that they were both against innatism and empiricism and conceived of an active construction of knowledge by the learner. Vygotsky’s theory was therefore “*of the same kind as that of Piaget* (and) is not a species of another kind of “social constructivism” indicating that reality is somehow reduced to the social (Moll, 2002, p.17 (italics in original text)).

Kalantzis and Cope (2020) posited that Piaget’s constructivism reflects a pedagogy of linearity where social meanings are transmitted to the individual who accommodates and replicates them. They added that assimilation represents to some degree, the absorption of conceptual processes where the learner simply re-enacts what was shown to them. On the other hand, Vygotsky’s views on conceptual thinking which have influenced Learning by Design, “involves the development of transferable schemas” (Kalantzis & Cope, p.18). Thus, reflexive pedagogy positions the learner as a co-designer of meaning and a knowledge producer who collaborates with their peers (Kalantzis & Cope, 2010). The process of meaning making is a collaborative task where collaboration refers to “the ability to work with others to create collaborative knowledge where the sum of the knowable is greater than the individual contributions of colleagues in the

knowing” (Kalantzis & Cope, 2020, p.20). The process of effective knowledge making is observed in the dialogical backward and forward movement between the teacher and students and between students and students (Cope & Kalantzis, 2017). The structure of learning takes the form of “scaffolding [that] makes the learning more tractable for students changing complex and difficult tasks in ways that make these tasks accessible, manageable and within students’ zone of proximal development” (Vygotsky, 1962, 1978, cited in Cope & Kalantzis, 2017, p.10). The knowledge processes are thus aimed at externalising one’s thinking and shape thought through action (Cope & Kalantzis, 2015).

Additionally, in their argument against the application of Piaget’s constructivism as a theory that is relevant to the digital age, Cope and Kalantzis (2020) stated that his stages of development ignore learner differences which seem irrelevant. The effect of this is,

(t)o create pedagogical architectures of sameness, as every learner will follow the same path. This represents a failure to recruit identities for learners whose lifeworlds do not neatly coincide with the culture of institutionalized schooling. It also represents a failure to harness learner differences as a productive resource for learning. (p.19)

With reflexive pedagogy the new learner brings their experience, interests and voices to their tasks, connecting with their agency, identity and subjectivity. This perspective particularly frames the knowledge process of experiencing (Cope & Kalantzis, 2015). It starts from the premise of learners’ own interests and lifeworlds as “learners draw on their prior knowledge and lifeworld experiences going beyond the world of the classroom and making their own connections to their learning” (Van Haren, 2010, p. 275).

Reflexive pedagogy also focuses on social sources of knowledge (Kalantzis & Cope, 2020) which represent a shift from knowledge residing in an individual. There is also a shift in the balance of agency between the teacher and the learner where the latter has responsibility epistemic action. The teacher’s role is not static but complex and moves beyond the view of the teacher as a facilitator. Kalantzis and Cope (2010) described the ‘new’ teacher as a purposeful designer and manager of learning who is also able give learners’ space to take responsibility for their learning.

The teacher is equally framed as a collaborative professional who assumes an explicit role as they scaffold the learning particularly in the conceptualizing knowledge process.

Garrison and Anderson (2003) recognised the complexity of the teachers' role stating that they are involved in creating and shaping the evolving learning environment. They argued that in some instances, the teacher's role involves direct instruction which challenges the notion of the teacher as a facilitator. Additionally, Moll (2002) posited that there has been a misconception attributed to constructivism that the role of the teacher is that of a facilitator of learning. He argued that neither Piaget nor Vygotsky articulated such views. Instead, for Vygotsky, learning results from "systematic co-operation between a learner (or learners) and a teacher even in classroom contexts where collaborative peer learning is a dominant pedagogic strategy" (Moll, 2002, p.18). In the case of Piaget, the teacher is an organizer of children's developing knowledge and plays an important role in scaffolding the learning.

2.4 SUMMARY OF CONCEPTUAL FRAMEWORK AND THEORETICAL FOUNDATION

This chapter presented the conceptual framework and theoretical foundation of this study which was conceptualised through a pragmatic lens. Pragmatism reflects a pluralistic approach to inquiry, hence three frameworks were combined. Hokanson and Hooper's (2000) continuum of media use helped determine whether teachers' appropriation of digital technologies is transformed or is yet to be transformed. The knowledge processes of Cope and Kalantzis' (2015) Learning by Design pedagogy were blended with Anderson's (2003a) interaction equivalency theorem to examine teachers' pedagogical strategies. While Hokanson and Hooper and Anderson used a cognitive constructivist lens to frame their theories, Cope and Kalantzis drew on Vygotsky's social theory of learning to create a reflexive pedagogy. However, these frameworks share the view that learning is an active, generative process that occurs in authentic environments and privileges collaboration.

This study thus argues that learning in the digital age is an active, social and situated process that also allows for the individual construction of knowledge and understanding. Learning is mediated by tools, signs and symbols and values social as well as individual meaning making opportunities.

It also underscores the view that no single theory could best describe learning in the twenty-first century which combines asynchronous and synchronous technologies.

The next chapter presents the key literature on which the study is grounded.

CHAPTER 3: LITERATURE REVIEW

3.1 INTRODUCTION

This study aimed to investigate the characteristics of the contemporary classroom by observing and analysing the classroom practices. As such, the literature that were synthesised provided a framework to answer the following sub-questions:

1. In which ways have digital technologies been appropriated within the classroom to transform teaching and learning?
- 2.a Which pedagogical strategies do teachers need to employ in order to produce rich learning experiences in the contemporary learning environment?
- 2.b How is the epistemological diversity of learners being privileged through teachers' pedagogical choices?

This literature review begins with a brief description of the term 'learning environment' since the 21st century classroom has been conceptualised as such. Different perspectives on the future classroom are presented next. Given that the focus areas for the study were teachers' appropriation of digital technologies and their pedagogical practices, the research engaged with different perspectives on the use and integration of digital technologies as well as with debates on affordances, including digital affordances. This study used Anderson's (2003a) interaction equivalency theorem and Cope and Kalantzis' (2015) and Kalantzis and Cope's (2010) Learning by Design as the two frameworks to help understand teachers' pedagogical strategies. Hence, arguments around these two frameworks provided a deeper understanding of the collected data. Additionally, since the context of the study is the South African education environment, policy perspectives are presented together with extant literature on previous research into the adoption and integration of digital technologies in South African classrooms.

3.2 DEFINING LEARNING ENVIRONMENT

This study recognises the complexity of the environment in which children are expected to learn, and therefore conceptualised the classroom as a learning environment. The OECD (2015)

referred to the contemporary classroom space as a learning environment. It is argued that the concept of a learning environment is very complex and can be used to describe a gamut of activities, contexts, cultures and locations in which learning takes place. Salomon (2006) highlighted the following three characteristics of a learning environment comprising different components: student and teacher characteristics; the interactions between teachers and students as well as between students themselves; and learning activities and materials and rules and regulations. These components all interact and give meaning to each other. Learning environments are dynamic and not static as the interactions and their consequences are constantly changing. Lai (2008) added that a physical space is not a necessity for a learning environment as it can also exist online.

More recently, the disruptions to teaching and learning due to the Covid-19 pandemic have led to emergency remote learning, where learning in many institutions shifted to virtual spaces and lessons took place via video-conferencing applications. Lessons for some who had no access to such applications occurred via social media. Some schools later introduced a blended learning approach that alternated between face-to-face instruction and online learning, and for a few children, their classroom became completely virtual. Spaces for learning were extended to homes and the times for learning were adjusted to accommodate the new reality, resulting in learning occurring beyond the traditional classroom structure. This highlights the ubiquity of learning that can happen beyond the walled classroom space and without specified time limits.

In a recent publication, Kalantzis and Cope (2020) described the learning environment as an ecosystem which consists of “the complex interaction of human, textual, discursive and architectural dynamics” (p.1). This contrasts with traditional classroom characterised by linear arrangements consisting of seats, desks, the lecturing teachers with their textbooks.

This study framed the contemporary classroom as a dynamic learning environment that extends beyond the four walls of the traditional classroom. The ubiquity of digital technologies allows learning to happen anytime and anywhere.

The next section presents various perspectives on the 21st century classroom.

3.3 PERSPECTIVES ON THE FUTURE CLASSROOM

Over the years, there have been increasing calls for the classroom to change. Bruner (1996, p. 21) argued for the reconceptualisation of the classroom as a “subcommunity of mutual learners with the teacher orchestrating the proceedings”. He posited that the omniscient teacher would disappear from the new classroom since the notion of the omniscient teacher and the unknowing learner represents “an impoverished conception of education” (Bruner, 1996, p. 20).

Dede (2011) equally argued that since our current schooling system is based on the industrial era, it should be redesigned using digital teaching platforms. The latter are based on constructivist principles and contrast with traditional learning management systems that have behaviourist underpinnings (Dede & Richards, 2012) and which reinforce traditional teacher-centric approaches in the way course content is laid out and delivered. By using digital teaching platforms, the teacher can move quickly between different group configurations, from large to small groups, while learners can move seamlessly between using their devices for some activities and closing their devices for rich discussions (Dede & Richards, 2012). This idea of learners in different group configurations moving between use and non-use of digital technologies was articulated by the principal of Queenstown College as she shared her perspective of the contemporary classroom. Some of the current learning platforms, like the Apple platform used by the College, seem to fit Dede and Richards’ conception of digital teaching platforms. However, the use of these platforms may not be optimised in technology-constrained school contexts where learners lack access to mobile personalised smart devices.

In light of the ubiquity of communication technologies, e-learning is becoming increasingly popular. Calls for completely virtual learning spaces have intensified particularly in the wake of the COVID-19 pandemic. This is evidenced in the increasing number of online secondary schools in South Africa one of which is the University of Cape Town’s online high school that was established in 2022. Garrison (2016) described e-learning as the nexus between technological and pedagogical developments. Garrison and Anderson (2003) posited that “the goal of quality e-learning is to blend diversity and cohesiveness into a dynamic and intellectually challenging learning ecology” (p.3).

By harnessing e-learning affordances, the flipped classroom approach is viewed as another model of a contemporary classroom. This approach is seen as a hybrid approach to learning (Missildine et al., 2013), and represents but one element of the four blended learning models (station-rotation model, flipped classroom model, lab-rotation model, individual rotation model) proposed by Staker and Horn (2012). Flipped instruction can be described as the blending of face-to-face and online instruction, but there is a general lack of consensus as to what constitutes blended or hybrid learning and by extension flipped learning. Hall and Lei (2020) pointed out that in some instances scholars refer to the notion of blended by the way instruction is delivered, while the notion of flipped speaks to the “instructional location”. In other words, the classroom is flipped while learning is delivered in a blended way. Zainuddin and Halili (2016) described the flipped classroom approach as a combination of face-to-face classroom learning through group discussions and distance learning outside the classroom space using asynchronous video lessons and online collaborative activities. For Garrison and Kanuka (2004, p.97), blended learning represents “a fundamental reconceptualization and reorganization of the teaching experience”. They argued that “the quality and quantity of the interaction and the sense of engagement in a community of inquiry” (p.97) was crucial.

However, despite the promises of classroom transformation with a blended approach to learning, Cope and Kalantzis (2015) argued that if a teacher’s pedagogical strategies were not transformed, didactic pedagogical approaches may be perpetuated, and the same pattern of traditional discourse would persist. The online component could thus see the traditional lecture being replicated by technology with the learner passively engaging with electronic content. Learning is not transformed in this way.

The current concept of a flipped classroom assumes the out-of-school connectedness of learners who have ubiquitous access to technologies and can engage asynchronously in online tasks. Cope and Kalantzis’ (2017) vision of the contemporary classroom as part of their e-learning ecologies, reflect how a flipped classroom approach can be achieved and may appeal to the South African context where many learners do not have access to technology at home. It imagines different classroom configurations where learners can work collaboratively in groups or individually either at school or at home while being virtually connected. Learners could also work in the school’s

resource centre or anywhere in the community, reflecting the ubiquity of learning and the classroom.

Given the accessibility of multiple semiotic modes, the contemporary classroom has also been described as multimodal. Ryan et al. (2010) described the contemporary classroom as multimodal as it engages students and teachers in a variety of meaning-making systems and technologies, which can be linguistic, visual, spatial, gestural and audio. Pahl and Rowsell (2005, p. 114) articulated a similar perspective by arguing that the new classroom space needs to “speak to the needs of all students (and) must be able to exist in two and three dimensions [in print and virtual worlds]”. The classroom of tomorrow is therefore a multimodal space using different media and with tasks that involve problem-solving and analysis. Students are provided with opportunities to develop critical literacies skills using a range of texts (Pahl & Rowsell, 2005). Their views reflect a ‘multiliteracies’ perspective, and hence, aspects of Learning by Design.

Ertmer (1999, p. 49) presented a vision of an integrated 21st century classroom in which “students have opportunities to see the connections between subject areas and in which multidisciplinary learning occurs”. An example of Ertmer’s vision could be seen in Queenstown College’s integrated curriculum for Grade 8 and 9 in which subjects were combined into modules for multidisciplinary learning. This will be explained further in section 5.2.1 where Queenstown College’s school context is described.

The above perspectives of the future classroom speak to a multimodal environment that provides opportunities for blended learning and which addresses the needs of all learners.

The next section looks at literature about the appropriation of technologies that guided the analysis of teachers’ technology use.

3.4 THE APPROPRIATION OF DIGITAL TECHNOLOGIES

Digital technologies are only one aspect of a learning environment, but they are of particular importance because of the unique affordances they bring to the learning environment (Kennewell, 2001) and the possibility of “extending and deepening” the learning experience in ways that were not previously imagined (John & Sutherland, 2005). Digital technologies are

therefore important social resources (Selwyn, 2017) and mediational tools (Crook, 2001; Lim, 2002; Somekh, 2008) in the learning environment that do not exist in isolation but instead are “interwoven with the rest of tools and participants in the learning environment” (Lim, 2002, p. 412).

Selwyn (2017) categorised the range of digital technologies in education as: computerised devices; electronic devices; additive technologies; artificial intelligence tools and systems; various systems software and the applications software that are used with the operating systems. Computerised devices like tablets and laptops make it easier to access, modify, store and share data. Electronic devices like digital cameras, wearable technologies and digital projectors afford the curation, transmission and viewing of data. Additive technologies like 3D printers are capable of processing data in physical form while artificial intelligence tools and systems include simulation and applications software like virtual reality (VR) and augmented reality (AR) as well as robotics tools. The use of additive technologies like VR and AR is increasing in popularity in schools. Wang et al. (2017) described augmented reality as a continuum of computer-generated content with a backdrop of real-world environment. This combines virtual and physical objects representing mixed reality with virtual reality being the extreme where the environment is comprised solely of virtual objects. Hamilton et al. (2020) posited that with the use of immersive virtuality (I-VR), learners have the opportunity to explore complex subjects in a way that traditional teaching methods do not afford. Due to continued technological advancement, new immersive possibilities have opened up in education whereas, in the past, VR was restricted to field trips or classroom teaching. Wang et al. (2017) argued that AR affords numerous possibilities for learning innovations and affords educators “opportunities to create, customize and scale authentic student-centred, interactive learning experiences” (p.1400). Hamilton et al. (2020) however cautioned that the adoption of such technologies for teaching and learning needs to be based on sound evidence to ensure that they are used to their full potential.

Given the proliferation of digital technologies in contemporary society, the integration of such technologies is seen as an important aspect of teaching and learning that disrupts teaching approaches which exalt the teacher as an authority figure (Somekh, 2008). As Ertmer and Ottenbreit-Leftwich averred, “it is time to shift our mindsets away from the notion that

technology provides a *supplemental* teaching tool and assume, as with other professions, that technology is *essential* to successful performance outcomes” (2010, p. 256 italics in the original text). A similar view was articulated by Khan (2015) who argued that digital technologies are most effective when they are integrated into teaching. In this way, they are treated not merely as add-ons but are used as part of teachers’ routine pedagogical practices.

Several models have been created to conceptualise and help understand teachers’ adoption of digital technologies. UNESCO (2002) proposed a model that envisages ICT development along a continuum and which articulates different stages of teaching and learning with and through ICTs. In the first stage, ICT tools are linked to the emerging approach on the continuum when devices are procured; at this stage teachers’ pedagogies are still traditional. The second stage describes teachers and learners understanding of how to use ICT tools and is linked to the applying phase on the continuum. In this phase, teachers’ use of computers is still very basic and mainly for school management and administration. The third stage describes understanding how and when to use ICT tools and the ability to choose the appropriate tool for the task. This links to the third and fourth phases of the continuum, which reflect the integration of technologies in the classroom and a shift to learner-centred pedagogies. During the fourth stage of ICT use, learners study ICTs as a subject in order to become specialists. UNESCO’s model therefore reflects technology use for computer literacy right through to technology use as a specialist subject. This approach frames ICT integration as a linear process during which teachers move from one phase to the next and learners’ technology use is compartmentalised. Yet, teachers’ appropriation of ICTs is an iterative process that does not reflect progression from one phase to the next.

Puente’s (2006) substitution, augmentation, modification, and redistribution (SAMR) model is a taxonomy-based approach that presents the integration of digital technologies along a ladder that teachers ascend (Hamilton et al., 2016). This model was developed as a framework to understand and improve teachers’ use of digital technologies with the lowest level (substitution) referring to technology being used to substitute non-digital tools and the highest level (redefinition) describing the creation of tasks that could not have been done without the use of technology (Puente, 2006). Hamilton et al. (2016) criticised this model as presenting a hierarchical taxonomy that does not acknowledge the complexity of teaching with digital

technologies. They added that the purpose of integration should be to enhance and support learning instead of using a particular technology. In this way, the teaching and learning process remains the central focus instead of the technology. Another weakness of the SAMR model that has been highlighted is its lack of theoretical foundation, which may prejudice the way it is interpreted. Selwyn (2017) also criticised the linearity of the SAMR model likening it to “black boxing technology use” as “the complexities of technology use” are reduced “to issues of ability to plug in a device and use it” (p.105). Hamilton et al. (2016) therefore suggested the creation of flexible models that treat the process of learning with digital technologies as a dynamic process where a teacher chooses to use digital technologies depending on the learning outcomes, the context and the learners in the classroom.

Hokanson and Hooper’s (2000) continuum of technology use is a flexible model that prioritises teachers’ pedagogies instead of the technology. They argued that the major pedagogical shift in approaches to learning has influenced the way in which computers are used in education and has given rise to the question, “do we teach with computers or do students learn with computers?” (p.543) Findings from an historical overview of the use of new technologies and in particular the shortcomings of the use of new media in education indicated that initially traditional instructional methods were being used with the new media (Hokanson & Hooper, 2000). Hence, activities in which computers were used were largely representations of experience and activities that demonstrated exemplary uses of computers were limited.

Consequently, Hokanson and Hooper (2000) proposed two instructional approaches for the effective use of media in education. These approaches place media use along a continuum from representative to generative use. When media are used in the representative sense, the focus is on delivering instruction, and in the generative sense, it leads to the generation of thought and new ideas, transforming the original idea and leading to the creation of knowledge. A good example they gave was note taking that involves copying or storing information for later access, which can be viewed as a representational activity, but note taking that involves the transformation of the original information and allows the learner to integrate new information can be regarded as a generative activity. Likewise, simple word processing activities where learners type, save and retrieve notes could be seen as technology being used in the

representative sense. However, if the original information is transformed by inserting hyperlinks, images or mind maps, then the media are used in its generative sense.

Hokanson and Hooper (2000, p. 547) therefore argued the following:

What is important about computer use is not being able to word process, or view a multimedia presentation, but the ability to interact with the computer in the manipulation and creation of knowledge through the manipulation of various symbol systems. The value is not in more efficient representation but in improving the ability to generate thought.

In a subsequent article, Hokanson and Hooper (2004, p.247) posited that “the value of the computer in education may be clarified by distinguishing between using it as a transmission device or as a learning device”. They added that “too much emphasis has been placed on learning *from* technology (for example, watching educational television, completing computer drills and tutorials) rather than learning *with* technology” (p.247). Learning *from* technology, which represents the initial use of computers, is classified as the representative use of media and learning *with* technology is seen as using it in the generative sense. They argued that “defining the computer as a tool, something used to deliver instruction to the students is limiting” (Hokanson & Hooper, 2000, p. 550) and ignores its generative potential as it uses only part of its capabilities. Instead, computers, and by extension digital technologies, should be more broadly conceptualised as cognitive media since a cognitive medium provides an environment for intellectual growth. This shift alters the perspective of how computers should be used in education and moves the focus from representative use to generative use (Hokanson & Hooper, 2000).

Jonassen (1996) articulated a similar perspective describing the traditional use of computers as learning *from* computing (characterised by computer-assisted instruction and drill-and-practice activities) and learning *about* computing (aimed at developing computer literacy skills). Jonassen noted that it is necessary to de-emphasise computer literacy in schools because it is no longer necessary as many children are exposed to computers at home and in pre- and primary schools. Another reason for the proposed de-emphasis is the disparity between what is taught and the educational goals of schools. While he acknowledged the need for some level of computer

literacy, he advanced that it is not necessary for it to be taught since learners do not need to understand it to be able to use it. He asserted that “knowledge of any tool is most meaningful if acquired in the context of learning how to effectively use that tool” (p. 9). Nevertheless, Jonassen’s view might be applicable to learners from private independent well-resourced schools that provide children with computer literacy skills from primary level. However, most children in South Africa lack access to digital technologies at home, and opportunities to learn *about* computing are vital and thus computer literacy is necessary.

Jonassen (1996) also proposed that learning *with* computing allows computers to “function as intellectual partners with the learner in order to engage and facilitate critical thinking and higher-order learning”. He therefore asserted that using computers and computer applications as mindtools actively engage learners in knowledge creation. Schifter and Stewart (2010, italics in original text) shared a similar perspective and equated learning *from* technology to instructivist pedagogy, which indicates that the learner is relatively passive in the learning process. They added that learning *with* or *through* technology suggests constructivist pedagogical approaches, which means that digital technologies are used for problem-solving and for critical thinking.

This research treats computers and other forms of digital technologies as mediational tools. Using Jonassen’s (1996) perspective, this study shares the view that while it is important for learners in South Africa to learn *about* computers at school since many households lack access to such technologies, computer literacy activities should be situated in the act of using digital technologies “to do something that is useful, meaningful and intellectually engaging” (Jonassen, 1996, p. 9). So, while opportunities should be provided for learners to learn *from* and *about* digital technologies, the greater focus should be on learning *with* such technologies by exploiting the various affordances, thereby creating opportunities for knowledge creation.

Regarding teachers’ appropriation of digital technologies, initially it was assumed that adequate access to technological resources and training in their use would result in effective classroom integration. The White Paper on e-Education (Department of Education, 2004) argued that regular access to reliable ICT infrastructure could lead to the success of e-learning initiatives. However, despite increasing access to digital technologies, teachers’ appropriation and integration have been inadequate. Marcinkiewicz (1994, cited in Buckenmeyer, 2010) posited

that simply providing more access to digital technologies will not encourage teachers to integrate them into their pedagogies. A lack integration can be attributed to a number of factors, and one factor is their beliefs about and attitude toward technology use, which can strongly predict technology use (Ertmer, 1999; Ng'ambi, 2013). Ertmer (1999) described first- and second-order barriers to integration; first-order barriers are obstacles that are extrinsic to teachers and are institutional and incremental, including lack of access to computers and other forms of digital technologies, insufficient planning time, and inadequate technical and administrative support. Buckenmeyer (2010) argued that teachers need time to learn new technologies and to integrate the technologies into their practice. If not, they resort to what is already known. Further, Flanagan and Jacobsen (2003) postulated that computer literacy skills learnt in isolation are easily lost if they are not applied in the classroom. A similar perspective was shared by Angeli et al. (2015) who blamed teachers' lack of skills to teach effectively with technology on the teaching of technical skills with a limited amount of time being spent on how technology interacts with pedagogy and subject matter. Koehler et al. (2013) criticised the decontextualised approach to teacher learning with technology, arguing that "many approaches to teachers' professional development offer a one-size-fits-all approach to technology integration when in fact teachers operate in diverse contexts of teaching and learning" (p. 14).

An extrinsic and contextual barrier to teachers' appropriation of digital technologies is a lack of shared pedagogical vision and principals' negative beliefs about their use. Hew and Brush (2007) posited that if a principal does not understand ICT use, and this research adds, is not aware of the affordances of the many forms of digital technologies at their institution, then it is unlikely that teachers will be motivated to integrate them into their practice. In addition, Flanagan and Jacobsen (2003, p. 127) stated the following:

Many principals have not been prepared for their new role as technology leaders and have therefore struggled to develop both the human and technical resources necessary to achieve ICT outcomes in their schools. Very few principals have themselves used computers in meaningful ways with children, and therefore lack the requisite pedagogical vision and experience to guide teachers.

Second-order barriers are personal, fundamental, and intrinsic to teachers and include teachers' beliefs about technologies and teaching, their established classroom practices, and their unwillingness to change. Uhlenbeck et al. (2002, cited in Hermans et al., 2008) posited that teachers enter the classroom with preconceptions and personal theories about teaching and learning that positively or negatively influence the way they adopt and integrate digital technologies in the classroom. Strong constructivist beliefs are also deemed a strong predictor of technology use (Sang et al., 2010; Wilson-Strydom et al., 2005). The assumption is that teachers whose pedagogies are more learner-centred use digital technologies in more transformative ways. However, Lui (2011) found that there is a disparity between teachers' beliefs and their appropriation of digital technologies. Both teachers with learner-centric or constructivist beliefs as well as those with teacher-centric or traditional pedagogical beliefs used technologies for lecture-based activities, which means they used it for representative purposes.

Another factor that influences teachers' use and appropriation of digital technologies is their self-efficacy. This relates to their perceptions about their ability to teach and is a predictor of their prospective computer use. Teachers with high self-efficacy are not averse to experimenting in the classroom and are open to new ideas (Sang et al., 2010). Such teachers are therefore more willing to appropriate digital technologies in their classrooms and use them more often. Neugebauer et al. (2019) similarly posited that teachers with high self-efficacy are more likely to adopt interactive teaching methods and be willing to adopt new pedagogies. This implies that teachers with low self-efficacy vis à vis computers are reticent and less confident about using them in the classroom. A shared vision of how digital technologies can improve learning could help transform teachers' role and reduce 'chalk and talk' (Kerr, 1996, cited in Ertmer, 1999). This is another way to shift teachers' appropriation of digital technologies from representative use to generative use. Flanagan and Jacobsen (2003) argued that it is the duty of school leadership to develop a vision for technology integration and clearly communicate that vision to teachers.

Another factor that determines teachers' transformative use of digital technologies in their classrooms is their knowledge of the affordances of the technologies available in their learning environment. The next subsections explore general literature on affordances then specifically on digital affordances.

3.4.1 Affordances

According to John and Sutherland (2005, p. 406), “learning is always distributed in some form between the technology, the learner and the context and there is nothing inherent in technology that automatically guarantees learning”. Thus, it is important for teachers to be familiar with the various affordances of digital technologies and the pedagogical opportunities they present in order to enhance the learning experience for learners. To understand teachers’ appropriation of digital technologies, this study examined how teachers in the participating schools harness the affordances of the technologies available to them to transform their practices.

Norman (1988) popularised the term affordance as it relates to human computer interaction. However, it was in Gibson’s (1979) seminal work in ecological psychology that the notion of affordance originated. Gibson believed that there is a mutual connection between an organism and their environment, referred to by Gaver (1991, p. 80) as “the complementarity of the acting organism and the acted-upon environment”, and that an animal’s visual perception should not be studied in isolation from the environment that is perceived. This view has echoes of a ‘situated approach’ to learning, which emphasises that learning cannot be divorced from context. McGrenere and Ho (2000) explained Gibson’s definition of an affordance as “an action possibility (that is) available in the environment to an individual (but is) independent of the individual’s ability to perceive this possibility” (p. 1). An affordance is thus invariant and exists whether the actor can perceive it or not, but since the affordance does not there it is always available to be perceived (Gibson, 1979). The concept of direct perception is fundamental to Gibson’s perspective of an affordance and speaks to the act of picking up information to guide action (McGrenere & Ho, 2000).

On the other hand, Norman (1988) referred to an affordance as the perceived and actual properties of an object and suggested that a perceived property may or may not be an actual property and yet be considered an affordance. Norman (1999) was particularly interested in perceived affordances as they pertain to design and felt that it was the designer’s job to ensure that relevant actions that are needed can be easily perceived. Affordances are therefore not very beneficial if they are invisible to the user. As such, his focus was designing the environment so

that utility can be perceived (McGrenere & Ho, 2000). Norman (1999) explained that perceived affordances can be design features or the displays on a computer, which are separate from real affordances that may not always be visible. He added that a computer has built-in physical affordances like the keyboard, the display screen, the pointing device and selection (mouse) buttons that afford pointing, touching, looking and clicking. So, for Gibson (1979) the frame of reference is the action capabilities of the actor, and for Norman (1988, 1999) it is the mental and perceptual capabilities of the actor.

Gaver (1991) supported Gibson's (1979) theory of direct perception and referred to affordances as providing potentials for action identifying different types of affordances. He argued that perceptual information may imply the existence of affordances that are false while those that exist may not be perceivable. McGrenere and Ho (2000) found the concept of a false affordance problematic and suggested that it is not the affordance that is false but rather the available information about the affordance, which Gibson termed misinformation. This differs from a hidden affordance, which is one for which no information is available and must be inferred from evidence. Nested affordances are affordances that are "grouped in space" (Gaver, 1991) and relate to affordances that exist in other affordances.

Conversely, perceptible or inter-referential affordances are affordances for which information is available (Gaver, 1991). He argued that what is perceived can therefore be acted upon, and Hammond (2010) averred that an affordance cannot be realised unless it is perceived. Gaver (1991) suggested that the perceptibility of an affordance is determined in part by the actor's culture, social context, experience and intentions. Hammond (2010) agreed and argued that "past experience, memory and context should not be ruled out as they directly influence the way an organism comes to know his environment". He added that we can perceive directly because of our familiarity with our environment, and hence, we are curious to know more about it. Knowing, he continued is thus "an active process" as there is a constant quest to learn more about one's environment. This view reflects a sociocultural approach to learning, around which this study is framed, and highlights the social and situatedness of teachers' and learners' engagement with affordances.

Gaver (1991), like Hammond (2010), acknowledged that affordances are complex and cannot be perceived passively but must be explored. Sequential affordances, which are affordances that are revealed as one acts on a perceptible affordance, emerge through interaction and engagement with a tool. This suggests nonlinearity and describes the nonlinearity of the World Wide Web and other digital technologies. The notion exploring to discover sequential affordances highlight the importance of continuous teacher learning in professional learning communities (PLCs) or individually to learn more about the affordances of digital technologies that are always being updated.

Kennewell (2001) explored the issue of constraints, which he asserted are not the opposite to affordances but instead are complementary and necessary. So, while affordances are attributes that create potential for action, constraints are “the conditions and relationships amongst the attributes which provide structure and guidance for the course of actions” (p. 106). For example, an internet search engine affords accessibility to diverse sources of information but can be constrained by learners’ lack of computer and information literacy skills. This brings us to the question of the affordances of digital technologies. The next subsection reviews literature relating to digital technology affordances.

3.4.2 Digital Technology Affordances

Gaver (1991) posited that “an affordance of an object refers to attributes of both the object and the actor (which) makes the concept a powerful one for thinking about technologies because it focuses on the interaction between technologies and the people who use them” (pp. 79–80). Hammond (2010) similarly stated that affordances are revealed in an actor’s interactions with objects or tools. He therefore posed the following question: How do the tool and user come together? This study assumed that affordances emerge during the interaction between the actor, which for the purposes of this study are teachers and learners, and the various technologies and the technological tools. These are all influenced by the contexts and lived experiences of the actors. However, action possibilities differ according to need, and the same object can provide different affordances simultaneously and to different organisms. Laurillard et al. (2000) articulated a similar view by stating that “different actors might perceive and act differently when

confronted with the same affordance” (p. 36). Citing a study by Downes (2002), Hammond (2010) discussed the differences in the ways teachers’ and learners’ perceptions of a tool may conflict. Downes (2002, cited in Hammond, 2010) suggested that children may see playability as an affordance in computer use, which may conflict with the teacher’s view. Hammond added that this difference in perception may explain some of the challenges encountered when ICTs are used for learning. It may also explain the tension between some learners’ and teachers’ perceptions about smartphone use in class and why some learners in Duke’s College exploited the playability of their mobile devices while the English teacher expected them to use their devices for pedagogical purposes.

Additionally, a teacher must perceive or be aware of the affordances of a piece of technology for it to be effectively harnessed in the classroom. Ng’ambi (2013) posited that an awareness of the affordances of emerging technologies is a precursor for teachers’ use. For example, Armstrong et al. (2005, p. 457) postulated that “the IWB potentially affords interaction if the teacher perceives that it can be used in this way and uses appropriate software that also affords interaction. The IWB may not afford interaction if it is perceived as a presentation tool only”. In this case, the IWB functions like a chalkboard and is merely a prop for the teacher (Cope & Kalantzis, 2015). So, how technologies are used determines their influence on teaching and learning and relates to teachers’ and learners’ perceptions and their usability (McGrenere & Ho, 2000). Hammond (2010) added that “if a teacher is unable to directly perceive the affordances of ICT, in relation to well-rehearsed goals ... then he or she is unlikely to be an enthusiastic adopter” (p. 10). Armstrong et al. (2005, p. 456) suggest the following:

The teacher and students work within a local classroom culture, which is influenced by local, national and global factors. Within this context, the teacher and students bring to the classroom a history of experiences which relate to their previous cultures of learning and tool use. So, when faced with a new technology, a teacher is likely to make sense of it in terms of previous experiences of older technologies.

Consequently, teachers may use interactive white boards as an extension of the non-digital whiteboard. So, instead of transforming a teacher’s technological pedagogical approach, digital technologies can be assimilated into existing ways of working. This was particularly evident in the

practice of the two teachers at Baker College, who did not use the interactive capabilities of the IWBs.

Teachers' ability to actualise the affordances to provide rich learning experiences for students is of special significance to this study. Strong et al. (2014) distinguished between "affordances as potentials for action and actualisations as actions taken by individuals to realize those potentials" (p. 54). They highlighted how important it is for organisations to focus on affordance actualisation. This is of particular significance for schools that emphasise providing opportunities for teachers to learn to use technologies and learn about their affordances but do not provide continuous learning opportunities for them to be able to actualise these affordances in the classroom. This can occur through the creation of PLCs or other forms of communities of practice. Educational technology coaches that help teachers harness technology affordances (Drennan & Moll, 2018) is another way of helping teachers actualise digital technology affordances.

There is an abundance of literature addressing the subject of affordances but there are differing views about what these are with respect to digital technologies, especially for schools. Some focus on communicative affordances, like portability and multimediality (Schrock, 2015), technological or physical affordances or physical affordances. Drennan (2019) discussed the technological and pedagogical affordances of iPads. They used technological affordances to refer to functions like video and audio playback and the ability to take a photo and pedagogical affordances to explain how the photo is used, mobility, ubiquity and the ability to swipe and record movies. McLoughlin and Lee (2007) argued that capabilities like typing, editing, and by extension, taking photos, swiping, clicking are not affordances but rather enable affordances. This study makes a clear distinction between technological affordances, like monitoring, playing of videos, podcasting, accessing digital books and curating resources, and pedagogical affordances, some of which are not immediately perceptible to the teacher and require continuous teacher learning to be perceived.

Dlamini and Nkambule (2019) proposed dimensions of ICT affordances through the lens of the human-computer-human interaction model represented as technical interaction, social interaction, informational interactions, and computational interactions. They argued that these are complemented by Anderson's (2003a) interaction between learners, educators and content.

They also mapped ICT affordances into four principles of learning, as stated in the theory of connectivism (Downes, 2012). These are autonomy, connectedness, diversity and openness. Autonomy speaks to the potential of ICTs to encourage ubiquitous learning, which supports a learner-centred approach to learning. Connectedness is linked to connectivism, which Dlamini and Nkambule (2019) posited as the approach that best supports digital pedagogy. Diversity is of particular importance to South Africa where there is unequal access to quality education.

Cope and Kalantzis (2017) proposed seven digital or e-learning affordances, shown in Figure 3.1, and developed an analytical framework to represent the transformative use of emerging technologies that reflect their generative use (Hokanson & Hooper, 2000). These affordances are ubiquitous learning, active knowledge making, multimodal meaning-making, recursive feedback, collaborative intelligence, metacognition and differentiated learning, and they are framed in seven different principles. These principles and affordances are discussed in the following subsections.

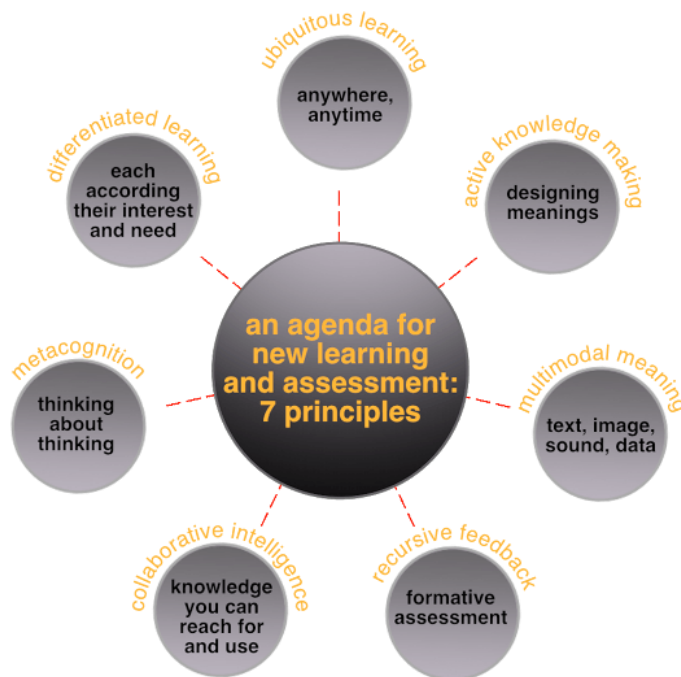


Figure 3.1: e-Learning affordances (Cope & Kalantzis, 2017)

3.4.2.1 Ubiquitous learning

Ubiquitous learning, framed within the spatio-temporal dimension, is anytime, anywhere learning that speaks to the accessibility of resources to learners and teachers at any time and from any place. Dlamini & Nkambule (2019) suggested that the ubiquity of new digital technologies ensures greater access to information and learning resources beyond the physical book. Learners can also collaborate and share in virtual environments. However, the presence of new technologies in a classroom does not mean that learning is automatically ubiquitous since “old learning can be done on new machines” (Cope & Kalantzis, 2009, p. 576). Conole and Dyke (2004) listed accessibility as part of their taxonomy of ICT affordances. The pervasiveness of many forms of ICT makes it easy to access a wide range of information, particularly on the internet. Smartphones, which are presumed to be the most dominant form of digital technologies among South Africans (although this has not been confirmed in literature), also facilitate anytime, anywhere student-centred learning (Cochrane & Bateman, 2010). Ubiquitous learning is therefore made possible because of the accessibility of technologies. This ubiquity allows for multiple possibilities of interaction (student-content, student-student and student-teacher) beyond the walls of the physical classroom. In the case of South Africa, the ubiquity of mobile phones can present new possibilities for access to diverse sources of knowledge and new forms of interaction between teachers and learners, especially in poorer-resourced contexts.

3.4.2.2 Active knowledge making

Active knowledge making, which this study considers a key indicator of the transformative use of digital technologies, belongs to the epistemic dimension, where the learner is a knowledge producer and a “discerning knowledge discoverer and navigator” (Cope & Kalantzis, 2017, p. 14). This can occur through student-content interaction with a learner working synchronously, asynchronously or in collaboration with others. Active knowledge making can also facilitate the development of higher-order thinking skills.

3.4.2.3 Collaborative intelligence

Collaborative intelligence belongs in the social dimension and links to Dlamini and Nkambule's (2019) construct of social connecting. Social connecting creates the possibility for continuous peer-to-peer or student-student interaction, where learners can engage with each other beyond the physical classroom space by connecting virtually. McLoughlin and Lee (2007, pp. 666–667) called collaborative information discovery and sharing an affordance relating to Web 2.0 and suggest the following:

The collaborative possibilities offered by Web 2.0 which allows for sharing, thrives on the concept of collective intelligence which acknowledges that when working cooperatively and sharing ideas, communities can be significantly more productive than individuals working in isolation.

Their view resonates with that of Cope and Kalantzis (2017), who posited that with high connectivity and ubiquity in this digital age, our vision of pedagogy should be broadened for learners to become active participants and co-producers of knowledge rather than passive content consumers. McLoughlin and Lee (2007) suggested that social software tools, like content management (blogs, wikis), learning management, digital learning platforms and multiplayer online games (Classcraft, Minecraft), enable interaction, idea sharing and information delivery. Godsk (2013) attributed tablets to affording engaging, inclusive and/or collaborative learning with students and teachers as producers. The use of tablets, which is the technology of choice for learners in one of the schools in this study, affords collaborative learning through student-teacher and student-student interactions.

Collaborative or collective intelligence and collaborative information discovery and sharing involve the transformative use of digital technologies through active knowledge making through student-student or teacher-student-content interactions. Mediated synchronous discussions using various audio and video-conferencing applications facilitate active knowledge making by harnessing the collective intelligence of teachers and learners. The creation of virtual communities of practice for learners as well as virtual PLCs for teachers thus contribute to collaborative intelligence and active knowledge making.

3.4.2.4 Multimodal meaning

Multimodal meaning-making is part of the discursive dimension, which includes the use of new media, such as text, sound, image and data, to allow for multimodal representations of meaning. This represents a shift from the traditional focus on language in the form of text and writing and mainly in textbooks as the principal means of making meaning. Conole and Dyke (2004) listed multimodal and non-linear as an affordance where “the nonlinearity of the web (epitomised by hypertext and the use of powerful search engines) leads to the potential for different routes through, and forms of, learning” (p. 118). Contemporary meaning-making includes both digital and non-digital tools and combines colour, writing, sound, images (both still and moving), and gestures. According to Adami (2017), whether face-to-face or through distance learning, synchronous or asynchronous, every aspect of communication involves the use of more than one mode to make meaning. The nonlinearity of the internet also affords mode switching and modes that are nested within other modes. This speaks to Gaver’s (1991) concept of nested affordances. Examples of the multiplicity of modes to make meaning can be seen in the way meaning is made on TikTok and Instagram. The multimodal character of digital tools therefore must be harnessed to redefine the way learners and teachers engage with texts in the contemporary classroom and in a way that reflects learners’ out-of-school practices.

3.4.2.5 Recursive feedback

Recursive feedback is another digital affordance proposed by Cope and Kalantzis (2017) and is framed within the evaluative dimension. It focuses on formative assessment rather than summative assessments, which they argued provide “retrospective judgements” to learners that are more useful for management purposes than for assisting learners to take immediate action. Recursive feedback, on the other hand, provides prospective and constructive feedback, sometimes using learning analytics. This is possible because of the immediacy of digital technologies, another affordance in Conole and Dyke’s (2004) taxonomy. Administering quizzes using various online applications, or Office 365 Forms or Google Forms, for example, provide immediate and real time learner feedback. Additionally, using digital learning platforms, like the Apple and Google platforms, make recursive feedback possible. The use of learning management

and digital learning platforms also make it easier for teachers to collect, analyse and visualise educational data which can be used to provide more targeted support for learners (Milkova et al., 2016). The affordance of learning analytics is becoming increasingly relevant in the 21st century classroom.

3.4.2.6 Metacognition

The affordance of metacognition is located in the cognitive dimension. Traditional approaches to learning focus on facts that must be remembered and theories that must be correctly applied; whereas metacognition deals with critical self-reflection. Reflection was listed as an affordance by Conole and Dyke (2004), who stressed that there is nothing inherent in digital technologies that nurtures reflection but that is rather in how they are used. In addition, asynchronous technologies, in particular, have the potential to encourage reflection and critique because users engage in discussions over a longer time frame than is possible in face-to-face discussions. Metacognition and reflection therefore afford learners the possibility to engage in critical self-reflection among themselves.

3.4.2.7 Differentiated learning

Differentiated learning is the last digital affordance suggested by Cope and Kalantzis (2017) and belongs to the comparative dimension. It breaks from the traditional one-size-fits-all curriculum and allows for a flexible, adaptive approach that addresses each learner according to their interests, self-identity and needs. In the context of this study, differentiated learning reflects harnessing epistemological diversity and more broadly recognises difference and diversity within the classroom. Conole and Dyke (2004) named diversity as an affordance, and Dlamini and Nkambule (2019) listed it as the third principle of learning. Diversity can range between access to a diversity of perspectives and views, access to a vast array of subjects and digital content, and a diversity of media forms, which all contribute to possibilities for differentiated learning. The ubiquity and accessibility of multimodal content on the internet offer numerous possibilities for teachers to differentiate their learning.

3.4.2.8 Interaction

Interaction is another affordance that has been attributed to digital technologies. Armstrong et al. (2005), for example, posited that an IWB potentially affords interaction if it is perceived as such by the teacher who uses the appropriate software. However, if the teacher perceives IWBs only as presentation tools, the interaction affordance will not be harnessed. They suggested that an IWB can also afford interactivity using various applications and may lead to different types of interactions between the teacher and learners. Armstrong et al. distinguished interaction from interactivity with the latter referring to “the functional aspects that the technology and software provide” (p. 457) while the term interaction highlights the cooperation between teachers and learners that contributes to the creation of new understandings and knowledge. The type of interaction to which Armstrong et al. referred indicates active knowledge making, as described earlier.

The term interaction is used in this study to describe the engagement between the teacher, learners and digital and non-digital resources, while interactivity represents another digital affordance made possible by the various applications and embedded software. This therefore suggests that for the affordance of interactivity to be optimised, IWBs must be continuously updated with new software because if the software is outdated, the action capabilities of the technology are reduced. This poses serious financial implications for the DoE and educational institutions that may be resource constrained.

In conclusion, this study considered the following digital affordances: interactivity; differentiated learning or diversity; metacognition; recursive feedback; active knowledge making; collaborative or collective intelligence; multimodality and nonlinearity; and ubiquitous learning, immediacy or accessibility. In a 21st century learning environment, “an understanding of the affordances of technology and how they can be leveraged differently according to changes in context and purposes is an important part of TPK [technological pedagogical knowledge]” (Koehler et al., 2013, p. 16). Consequently, teachers’ ability to combine opportunities to learn *from* and learn *with* technologies with a greater focus on learning *with* technology was assessed. A dominance of activities to learn *with* technologies indicates greater harnessing of the action capabilities of

technologies, indicating transformative technology use. Transformative technology use is also closely linked to teachers' pedagogical choices. The next section therefore examines the types of pedagogical approaches important in the 21st century learning environment.

3.5 PEDAGOGICAL APPROACHES FOR THE 21ST CENTURY LEARNING ENVIRONMENT

The effective integration of digital technologies into the classroom requires new pedagogical approaches. Traditional pedagogies, also described as didactic pedagogies, generally involve “the transmission of knowledge from the knowing expert to the as-yet-unknown novice” where the teacher is “an authority figure and the student ... a beneficiary of the knowledge they convey” (Cope & Kalantzis, 2015, p. 7). The pedagogical frameworks proposed in the following subsections are ways for teachers to change from their traditional pedagogical strategies to transformative approaches that are more suited to the contemporary classroom. These frameworks include Anderson's (2003a) interaction equivalency theorem and Cope and Kalantzis' (2015) Learning by Design pedagogy.

3.5.1 The Interaction Equivalency Theorem

According to Cope and Kalantzis (2000, p. 30),

Human knowledge is mutually developed as part and parcel of collaborative interactions with others of diverse skills, backgrounds and perspectives joined together in a particular epistemic community, that is a community of learners engaged in common practices centred on specific (historically and socially constituted) domain of knowledge.

Interaction as an expression of the participatory nature of the sociocultural approach is crucial for knowledge development and the creation of rich learning experiences. Traditionally, the term focused on classroom discourse between the teacher and learners (Anderson, 2003a). However, since interaction between and among learners, and between learners and content can lead to formal and informal learning, Anderson (2003b) argued that the participation of a teacher cannot be a defining characteristic of an interaction. Consequently, he extended the concept to include mediated synchronous and asynchronous discussions that afford new possibilities for learning.

Anderson criticised Wagner's (1994, cited in Anderson, 2003b) definition of interaction as reciprocity between a minimum of two objects and two actors that mutually influence each other as being too narrow because, according to him, exclusive human interaction is not a necessity in formal education. To differentiate between human interaction and interaction with machines, Wagner used the term 'interactivity', which was previously used by Bates (1991) to describe interactions between humans and machines. Nevertheless, Anderson (2003b) believed that it is futile to have two different words to describe human and machine interaction and opted to use the term interaction for all education. It is worth noting that in later articles Anderson (2004) used both interaction and interactivity to describe interaction in online contexts. Anderson found Dewey's (1938, cited in Anderson, 2003, p. 130) description of education as "a transaction taking place between an individual and what, at the time constitutes his environment" apt, particularly in the distance education context. He therefore averred that "both human and non-human interaction are integral and reciprocal components of a quality educational experience" (p. 131). This is regardless of whether the mode of delivery is face-to-face or at a distance. However, he asserted that it is still challenging to determine the pedagogical value of an interaction since not all interactions are pedagogically valuable.

Anderson and Garrison expanded Moore's (1989, cited in Anderson, 1998) three dyads of interaction in distance education (interaction between teachers and students; interaction between students themselves; and interaction with students and content) to include teacher-teacher; teacher-content and content-content interaction. Using only the first three dyads, Anderson (2003a) proposed an interaction equivalency theorem with two theses to describe patterns of interaction in distance education. These patterns of interaction are reflected in his model of online learning in Figure 3.2. The first thesis states the following:

Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience (Anderson, 2003a, p.129).

The second posits that,

High levels of more than one of these three modes will likely provide a more satisfying educational experience, though these experiences may not be as cost or time effective as less interactive learning sequences (Anderson, 2003, p.4)

In the first hypothesis, Anderson (2003a) focused on the quality of the interaction, suggesting that the intensity of one mode will lead to deep and meaningful learning. In the second proposition, the focus is on quantity, implying that quality learning can be achieved through a high level of interaction in more than one mode. However, he stated that for high levels of interaction to be achieved, the actors must be active and engaged in the interaction.

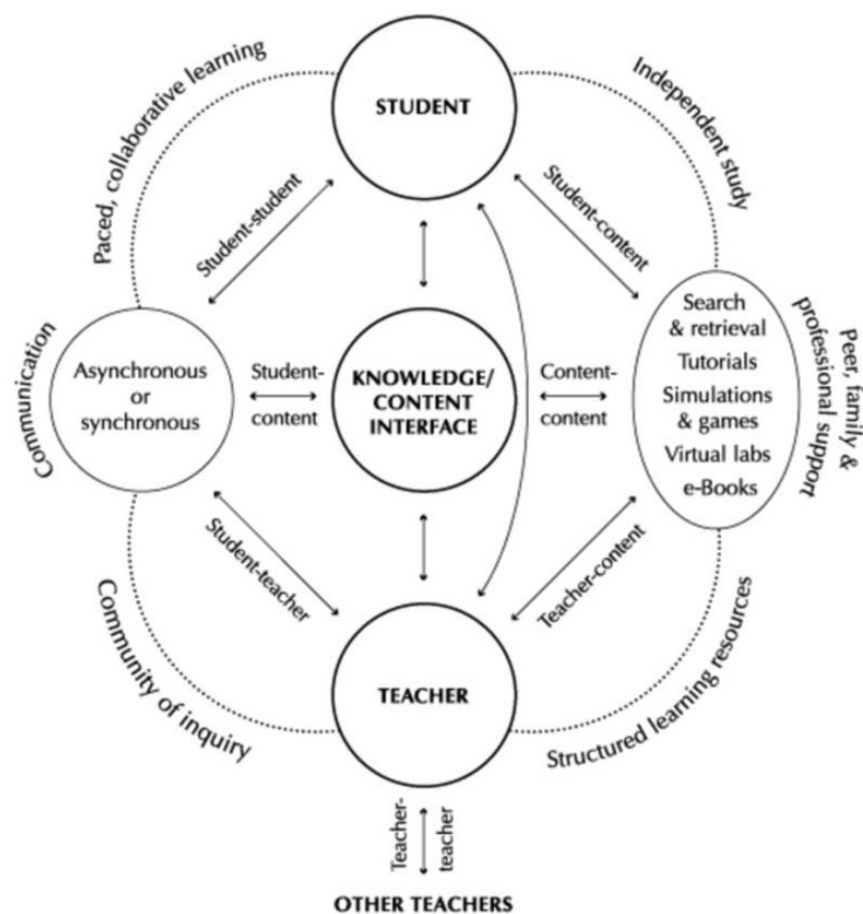


Figure 3.2: Anderson's model of online learning showing types of interaction (Anderson, 2004, p. 49)

Miyazoe and Anderson (2010) examined three studies that tested the validity of the theorem. Despite using different methodologies in different contexts, the results supported the first thesis,

showing that one mode of interaction can be more highly valued in distance education and possibly in a blended learning environment. In addition, the form of interaction that was valued varied among studies depending on the course content and learning modes.

Locally, Tarling and Ng'ambi (2016) reported on a study seeking to understand how teachers change their pedagogical practices with emerging technologies with the aim of developing a pedagogical change framework for teachers. Participants were drawn from rural, resource-constrained schools and urban, resource-rich schools. One of the frameworks used to map teachers' pedagogical practices was Anderson's (2003a) interaction equivalency theorem. Face-to-face and flipped classroom approaches were used. The findings revealed that teachers with transformative, learner-centric pedagogies fostered high levels of interaction among learners, while teacher-student and student-content interactions were dominant when teachers used transmission pedagogies. In addition, with the latter, interaction through pair or group work (student-student interaction) was highly regulated and restricted to the teacher's priorities. Tarling and Ng'ambi (2016) therefore concluded that "the role of the teacher to increase meaningful interaction between teacher and student, student and student and student and content is critical" (p.568). They added that the teachers' role may gradually decrease as learners take greater responsibility for their learning and become self-directed.

It is evident that more research is needed to test Anderson's (2003a) theorem in a flipped classroom setting and in face-to-face environments. Since this study applied Anderson's theorem to a face-to-face classroom setting, it was decided that it was important to distinguish between teacher-student interaction where the teacher presents content and information, and teacher-student-content interaction (created for this study) and where teachers and learners engage in joint meaning-making using analysis, would provide better insight into the nature of their interactions. Consequently, this study examined teacher-student, student-student, student-content and teacher-student-content interactions in the 10 observed classrooms. The next subsection therefore examines the different modes of interaction used in this study.

Teacher-student interaction

Teacher-student interaction refers to the most common engagement between the teacher and learners that “has the highest perceived value amongst students and thus commands highest market value” (Anderson, 2003a, p. 129). In a face-to-face classroom setting, traditional classroom discourse between the teacher and learners is usually structured around initiation-response-evaluation (Cazden, 2001, cited in Cope & Kalantzis, 2015) where the teacher initiates an interaction, a learner or learners respond, and the teacher evaluates the response through affirmation.

This study associates teacher-student interaction with the knowledge process of conceptualising from the learning by design framework as teacher and learners make sense of new concepts. A participatory approach involves the teacher co-opting learners’ prior knowledge and their lived experiences to scaffold the learning. In a more didactic setting, the teacher presents concepts and information, and perhaps asks learners the meaning of a word before clarifying or explaining. In the latter example, there is more ‘teacher telling’. Teacher-student interaction also involves some aspect of direct instruction (Garrison & Anderson, 2003) where the teacher provides diverse sources of information instead of relying on a textbook, giving explanatory feedback and summarising discussions. Scaffolding and collaboration are important in this process.

Student-student interaction

Perspectives on the social construction of knowledge as well as on situated learning (Lave, 1991) have contributed to the knowledge on student-student interaction (Anderson, 2003). The very act of engaging in such an interaction pushes learners toward a deeper level of meaning construction (Anderson, 2003a). Laurillard (2013) similarly noted that learners construct an idea, explanation or description in the act of collaborating, and this can be challenged, leading the originator of the idea or description to defend their idea and possibly modify or redevelop it.

Interaction among learners is therefore critical in the process of active knowledge making in the contemporary classroom. Possibilities for such interaction are extensive when synchronous and asynchronous communication using text, audio and video are used (Anderson, 2004) because

learners are able to collaborate with their peers, extending learning beyond the four walls of the classroom. However, for learners without ubiquitous access to technologies, student-student interaction is limited to the traditional classroom setting.

Student-content interaction

Digital technologies provide a number of multimodal ways to create content with which learners can interact, unlike in a traditional classroom setting where such interactions are based mainly on written texts. Anderson (2003b, p. 137) suggested the following:

Learners can ... interact directly with content they find in multiple formats and especially on the web (and) this interaction can take place within a community of inquiry using a variety of Net-based synchronous and asynchronous (video, audio, computer conferencing, chats or virtual world) interaction.

Student-content interaction can also replace face-to-face teacher-student interaction, particularly in a flipped classroom setting, freeing up contact time between the teacher and learners for richer discussions. One advantage of this type of interaction in an online environment is the affordance of immediate and recursive feedback. In addition, Anderson (2003a, p. 130) explained that “some teacher interaction can be transformed into learning objects (videos, animations, assessment programmes etc.), thus migrating student-teacher interaction to student-content interaction”. This was particularly evident during the shift to emergency remote teaching and remote learning during the recent COVID-19 pandemic when asynchronous technologies were used.

One could assess the value of content by its ability to engage learners and teachers in interactions that lead to relevant knowledge creation (Anderson, 2003a). In other words, content cannot be deemed beneficial to the learning experience if it does not engage learners in meaningful learning. Duke’s College English lesson on skills and knowledge that had no relevance to the protest poetry theme for the term was one example of content that was unrelated to the learning experience and did not contribute to meaningful learning. Learners were asked to create a list of the knowledge and skills they needed, like ironing a shirt or cooking, learn the skill and do the

activity at home; there was no follow-up by the teacher to ascertain if the task was ever carried out.

Teacher-student-content interaction

This mode of interaction is not part of Anderson's (2003a) theorem. However, it was included as a mode of interaction in this study to represent joint meaning-making between the teacher and learners that exemplifies the analysis and application of knowledge typical of critical and transformative pedagogies. In this way, the teacher and learners co-construct knowledge using a variety of multimodal texts and knowledge sources, thereby representing a community of inquiry. Garrison and Anderson (2003, p. 42) described a community of inquiry as "teachers and students transacting with the specific purpose of facilitating, constructing and validating understanding and developing capabilities that will lead to further learning". Teacher-student-content interaction is linked to the knowledge processes of analysing and applying.

Using Anderson's (2003a) interaction equivalency theorem as one of their frameworks for analysis, Tarling and Ng'ambi (2016) created a teacher change frame based on a study conducted with a diverse group of teachers in a variety of school contexts to interrogate their pedagogical practices, including the appropriation of emerging technologies. Their findings revealed that while teachers using transmission pedagogies may promote interaction through group or pair work, teacher-student interaction or student-content interaction, these activities were regulated and restricted to teachers' priorities. Secondly, teachers who used transformative pedagogies demonstrated "less regulated and more dispersed interaction" (p. 568) and also encouraged collaboration and shared meaning-making. Additionally, teacher-centric approaches were linked to regulated and restricted interactions while learner-centred approaches encouraged no regulations or restrictions in terms of interaction. Non-regulated and dispersed use described learner-centric approaches using scaffolding as a strategy where learners are allowed to choose the most appropriate tools in the classroom. On the other hand, regulated and restricted use refers to teacher-centric approaches where technologies are predominantly used by teachers who prescribe learner use.

In conclusion, Anderson (2003a) argued that “differentiating between high and low levels of interactivity is largely a quantitative exercise” (p.131) that involves counting the number of times the participants interact with each other or with content. He added that for high levels of interaction to occur, the actors should be active and engaged in the interaction. This suggests that traditional teacher-centred pedagogies indicate “medium levels of student-teacher interaction, usually low levels of student-student interaction and medium to low levels of student-content interaction” (p. 131). In analysing teachers’ practices, high classroom interaction is used to describe situations where learners are actively engaged in the meaning-making process, while medium to low levels of interaction describe greater learner passivity, regardless of the length of time spent in the interaction. ‘Getting the mix right’ is therefore a complex exercise involving “a series of trade-offs and knowing how one type of interaction can effectively substitute for another” (Anderson, 2003a, p. 129).

Along with Anderson’s (2003) interaction equivalency theorem, Cope and Kalantzis’ (2015) Learning by Design framework was used to analyse teachers’ pedagogical practices, and this is discussed next.

3.5.2 Learning by Design Pedagogy

Learning by Design pedagogy breaks from the passivity of the traditional classroom (Kalantzis & Cope, 2010) and reflects a new learning paradigm that privileges active and transformative learning. The New London Group (Cazden et al., 1996) coined the term multiliteracies in their seminal work that addressed the shift in conceptions of literacy learning. They regarded the issue of equity as vital to modern education; a value that has been deemed important in education in South Africa. They advocated for a ‘pedagogy of pluralism’ and argued that while learners do not have to be the same to have similar opportunities, they should have “the same kinds of opportunities measured in terms of access to material resources” (Cope & Kalantzis, 2000, p. 124).

Kalantzis and Cope and the Learning by Design team saw the need to extend the concept of multiliteracies to address learning in the digital age. Through research and several iterative activities in Australia and Malaysia, they created the Learning by Design framework as part of a

wider learning by design project (Kalantzis & Cope, 2010). It has assumed a larger agenda and encompasses pedagogies for all subject areas (Cope & Kalantzis, 2015). Like the multiliteracies framework, the learner is viewed as “a maker of meaning” and a designer who is constantly “redesigning the world of meaning” and in the process of redesign is adding their identity (Kalantzis & Cope, 2010). They referred to this type of learner as Generation P (participatory) and described them as knowledge producers instead of knowledge consumers. Generation P draws from multiple sources of knowledge instead of a single source or a textbook, and they operate in an environment where intelligence is collective, and as such, work collaboratively in pairs or in groups to produce knowledge (Kalantzis & Cope, 2010).

Learning by Design highlights three key principles that they deemed important in the digital age: diversity, multimodality and pedagogy (Education at Illinois, 2019a). Diversity extends beyond gross demographics and refers to the contextual resources that learners bring to the learning environment, including their sense of identity and their socio-economic backgrounds. Diversity is an important issue in any educational context but, it is of particular significance in the South African context with its history of marginalisation of the identities and cultures of the black population. One way of addressing the question of equity within the classroom environment is to value and harness learner differences which are important productive resources. Therefore, curriculum and pedagogy need to address diversity through transformation rather than the assimilation of learners (Kalantzis & Cope, 2010).

The concept of multimodality describes social and cultural meaning-making resources, and more recently, the plethora of digital resources, thereby representing a shift from the dominance of print media to image (Jewitt, 2008). This challenges the traditional view that meaning is made only through language as speech or writing and acknowledges that learners make meaning in a variety of modes (Jewitt, 2008; Kress, 2000, 2015). These modes can be linguistic, visual, spatial, gestural, audio, and layout (Cazden et al., 1996; Cope & Kalantzis, 2015; Kress, 2000), and more recently, such modes extend to data and codes. The impact of digital technologies, including online environments, highlighted the multimodal nature of texts and as such, language alone does not explain how meaning is made (Adami, 2017) because the concept of multimodality is complex and not always understood (Kress, 2015). Therefore, Jewitt (2008, pp. 241–242) stated

that “to better understand learning and teaching in the multimodal environment of the contemporary classroom, it is essential to explore the ways in which representations in all modes feature in the classroom”. Multimodality is an integral part of the Learning by Design framework and was incorporated in this study as an important digital affordance.

Kalantzis posited, “if we are correct about the issue of diversity, if we are correct about the types of learners coming into our classroom, there’s not going to be a one-size-fits-all pedagogy” (Education at Illinois, 2019b). Kalantzis and Cope (2010) described the term pedagogy as the principle of learning by design and refers to the purposeful choices educators make. Learning by Design combines different ways of knowing in the blending of the various knowledge processes of experiencing, conceptualising, analysing and applying to make meaning in the classroom. It breaks from the traditional discourse structure in didactic pedagogy represented by initiation-response-evaluation structure typically observed when the teacher poses a question, learners raise their hands and the teacher selects one person to respond and then evaluates the response (Cazden, 2001 in Cope & Kalantzis, 2015). The knowledge processes that Cope and Kalantzis (2015) proposed, and which are significant for this study, should be part of a teacher’s pedagogical repertoire. Figure 3.3 maps the different knowledge processes with their subcategories.



Figure 3.3: Learning by design knowledge processes

3.5.2.1 Experiencing

This knowledge process incorporates two different ways of experiencing: experiencing the known and experiencing new. Experiencing the known draws on learners' lifeworld experiences and builds upon the everyday and familiar, their prior knowledge and their personal interests, which are all treated as resources in the classroom (Cope & Kalantzis, 2015). Kalantzis and Cope (2010) posited that "experiencing the known engages learners in reflection upon their own experiences. It brings into the classroom familiar knowledge and ways of representing the world" (p. 209) and experiencing the new or unknown sees learners being immersed in new experiences that can be real events, places of situations or virtual texts, images or data (Cope & Kalantzis, 2015). However, they caution that there must be elements of familiarity in the new, which must be

scaffolded and made intelligible through interaction with the teacher, with peers or with textual cross-references. This highlights the importance of teacher-student, student-student and student-content interactions to help learners make meaning.

Aspects of the critical literacy reflect the knowledge process of experiencing. Critical literacy is framed around several areas in education, including sociocultural approaches to learning, and addresses issues such as power, diversity and access (Janks, 2013). A critical literacies approach thus connects to learners' lived experiences and cultures; introduces a variety of texts from their lives, including the multimodal texts that are accessible to them; makes connections with local contexts; and uses different types of texts from the internet, films and YouTube videos (Janks, 2013).

Delpit (1988, cited in Cope & Kalantzis, 2015) criticised the idea of focusing on learners' lived experiences and ways of knowing by arguing that such experiential approaches may be more relevant to affluent learners who have access to discourses of power. She posited that explicit teaching may be necessary for learners whose lived experiences do not provide access to different cultures of power and academic literacies. However, this study proposes that teachers could use learners' lived experiences to explain, critique and understand texts that may seem alien to their culture as a way of experiencing the new. An example of this is seen in one English lessons at Baker College where learners used their lived experiences to make sense of Shakespeare's *Twelfth Night*. This is explained in detail in section 5.6.

3.5.2.2 Harnessing learners' epistemological diversity

The concept of learners' epistemological diversity acknowledges that learners take complex identities and multiple background knowledges and discourses into the classroom (Pahl & Rowsell, 2005) that must be harnessed as powerful classroom resources; this extends what counts as legitimate classroom knowledge. Kellner (2002) argued that young people have multifaceted lifeworlds that schools must harness to make education more relevant to them. Learners are also growing up in multimodal cultural environments in which they interact with multiple semiotic modes and a diversity of texts in digital and non-digital formats. It is therefore

important that teachers' pedagogical practices do not ignore these powerful ways of making sense of the world and draw on learners' cultural worlds (McKinney, 2011).

This study locates the acknowledging of learners' diverse resources within Learning by Design and sees it as being particularly enacted during the experiencing and analysing processes. One aspect of the framework deals with diversity, belonging and transformation since learner subjectivity and identity should be engaged to create a sense of belonging (Kalantzis & Cope, 2010). This leads to more opportunities for "participative agency" that allows differences to thrive and creates a sense of inclusion (Kalantzis & Cope, 2010). For example, in experiencing the known, learners bring their diverse perspectives, experiences and knowledge into the learning context (Cope & Kalantzis, 2015); in analysing critically, learners are able to reflect on theirs and others' perspectives; and in applying creatively, they apply the new knowledge back to real-world environments and transfer their learning to other contexts (Kalantzis & Cope, 2010). Van Haren (2010) explained that learner diversity is enhanced when they are given opportunities to think, discuss, share ideas as well as develop their individual perspectives while contributing within a collaborative space. Learners should also be encouraged to present their learning in multiple modes in a way that provides them with choices and connects with their technological lifeworlds and subjectivities (Van Haren, 2010). Therefore, teachers demonstrate the incorporation of their epistemological diversity by co-opting learners' prior knowledge and diverse lived experiences (including their lived experiences with digital technologies); by making connections with local contexts (Janks, 2013) and allowing for participative agency; and by providing opportunities for learners to reflect on their practices and apply their knowledge in real-world contexts as well as connect to learners' ways of knowing and interests in the classroom.

3.5.2.3 Conceptualising

The knowledge process of conceptualising replaced overt instruction in the multiliteracies pedagogy framework by requiring active learner involvement in the conceptualising process. With overt instruction, the teacher has an explicit role as she introduces new concepts and theories by actively and explicitly intervening at students' point of need during the meaning-making process and by scaffolding learning activities and guiding the learning process (Cope &

Kalantzis, 2000). However, this does not suggest teacher-centred learning but reflects collaborative conceptualising between the teacher and learners. According to Cope and Kalantzis (2015), “(C)onceptualising, involves the development of abstract, generalising concepts and theoretical synthesis of these concepts” and “is not merely a matter of ‘teacherly’ or textbook telling” (Cope & Kalantzis, 2009, p. 185). It is divided into the following two categories: conceptualising by naming and conceptualising with theory. The former involves identifying similarity and difference, assigning categories, developing concepts, assigning distinct names, and learning the specific concepts of a learning area (Cope & Kalantzis, 2009). Activities can include defining terms, making a glossary, labelling a diagram, sorting or categorising (New Learning Online, n.d.). Conceptualising with theory is generalising and linking concept to concept as learners are expected to be “active concept and theory makers” (Cope & Kalantzis, 2009, p. 185) who weave between the experiential and the conceptual with activities such as writing summaries or creating mind maps.

3.5.2.4 Analysing

Analysing involves the capacity to be critical and includes the following two knowledge processes: analysing functionally and analysing critically. Analysing functionally is deductive and inductive reasoning, analysing structure and functions, drawing inferences, establishing cause and effect and analysing logical and textual connections (Cope & Kalantzis, 2015). In examining the function of a piece of knowledge or text, the following questions might be asked: “What does it do? How does it do it? What is its structure, functions, relations and context?” (Cope & Kalantzis, 2015, p. 20). Analysing critically involves the critical evaluation of one’s own and other people’s experiences, goals, agendas and biases (Cope & Kalantzis, 2015). It can be linked to a critical literacies approach in which learners analyse texts from many perspectives and explore different levels of meaning, including interrogating power and biases (Janks, 2013). Cazden (2006, cited in Cope & Kalantzis, 2009, p. 186) posited that as learners evaluate between other people’s perspectives and their own biases, they weave bi-directionally between known and new experiences as well as between prior and new conceptualisations.

The knowledge process of analysing critically does not include critical thinking, which is important for this study. Jonassen's (1996) perspectives on critical thinking that are included in his integrated thinking model have therefore been included in this knowledge process. Jonassen posited that "critical thinking involves the dynamic reorganisation of knowledge in meaningful and usable ways" (p. 29). It involves valuating, analysing and connecting. The skill of connecting is similar to the knowledge process of analysing functionally as it involves inferring deductively from generalisations and inferring a theory or principle inductively, logical thinking, comparing and contrasting.

3.5.2.5 Applying

Cope and Kalantzis (2015, p. 21) explained the knowledge process of applying as follows:

[It] requires learners to actively intervene in the human and natural world, learning by applying experiential, conceptual or critical knowledge—acting in the world on the basis of knowing something of the world, and learning something new from the experience of acting.

The knowledge process of applying requires combining the knowledge processes of experiencing, conceptualising and analyzing and reflects transformed practice within the multiliteracies pedagogy framework. In this process, learners act upon and apply the knowledge and understandings gained from other knowledge processes to solve a problem.

The knowledge process of applying integrates the processes of applying appropriately and applying creatively. Applying appropriately involves the application of understandings gained to real-world problems and applying creatively is transferring knowledge to new settings in innovative and creative ways. This can encompass the integration of new, experiential, conceptual or critical knowledge (Cope & Kalantzis, 2009, 2015) or applying knowledge using a different mix of modes of meaning (New Learning Online, n.d.). So, instead of responding only in writing, learners can create a multimodal presentation that incorporates the visual and audio-visual as well as the gestural/performance, as was done in the final assignment of the Grade 8 History group at Queenstown College. This is explained in section 5.2.

The knowledge processes of experiencing, conceptualising, analysing and applying are not a series of steps to be followed in a sequential manner but should be part of the teacher's pedagogical repertoire or moves that they weave to transform the learning experience and to help learners in the process of knowing (Cope & Kalantzis, 2009). The strength of the learning is therefore found in,

the overlay modes of knowing, the productive relation of one knowledge process to another – relating the conceptual to the experiential for instance, or application based on reasoned analysis or connecting prior experiences with new application. (Cope & Kalantzis, 2015, p.16).

In an ethnographic study investigating Year 8 learners and teachers' perspectives of how the Learning by Design framework helps teachers address diversity, it was found that the process of going back and forth between knowledge processes helped to build learner understandings and position them as active learners (Van Haren, 2010). She added that the integration of a variety of learning activities supported the diversity of learners and help them achieve their learning goals.

In conclusion, teachers' pedagogical strategies in the 21st century are about 'getting the mix right'. Apart from getting the right mix of modes of interaction, teachers need to get the right blend of knowledge processes to provide rich learning experiences for students.

3.6 THE SOUTH AFRICAN EDUCATION CONTEXT

3.6.1 The National Curriculum Statement

The National Curriculum Statement (R–12) and the revised Curriculum and Assessment Policy Statements (CAPS) elaborate the national education policy for teaching and learning. This is the most recent iteration of the basic education curriculum and builds on previous curriculum statements. The CAPS curriculum advocates for a shift from teacher-centric pedagogies to learner-centred approaches in order to develop higher-order thinking skills. Active and critical learning is a key principle of the CAPS policy, which is intended to produce learners who are able to identify and solve problems and make decisions using critical and creative thinking; work

effectively as individuals and with others as members of a team; and collect, analyse, organise and critically evaluate information (Department of Basic Education, 2011, para. 1.3.). These principles highlight the importance of collaboration and the need for transformative pedagogies that provide learners with the ability to critically analyse and appropriately and creatively apply knowledge, which are the knowledge processes articulated in the learning by design pedagogical framework. Additionally, one of the explicit aims is to ensure that “children acquire and apply knowledge in ways that are meaningful to their lives” (Department of Basic Education, para. 1.3). The policy also emphasises “the promotion of knowledge in local contexts, while being sensitive to global imperatives” (Department of Basic Education, 2011, para. 1.3). These goals reflect a situated approach to learning, which forms part of the theoretical foundation of this study.

The next section outlines key features of the government’s e-education White Paper and highlights the findings of studies into teachers’ adoption and integration of digital technologies.

3.6.2 The e-Education Policy

In recognition of the perceived potential of digital technologies “to improve the quality of education and training” and “the anticipated benefits to teaching and learning in the 21st century” (Department of Education, 2004, p. 8), the South African government drafted an e-education policy. These benefits include the advancement of higher-order thinking skills like problem-solving that are articulated in the CAPS policy document. This document states that e-education is more than just the development of computer literacy and the skills necessary to operate various types of ICTs. It is the ability to do the following:

- Apply ICT skills to access, analyse, evaluate, integrate, present and communicate information;
- Create knowledge and new information by adapting, applying, designing, inventing and authoring information; and
- Function in a knowledge society by using appropriate technology and mastering communication and collaboration skills (Department of Education, 2004, p.14).

Access to ICTs is therefore seen as crucial to bridge the digital divide and address issues of equity in a country with huge disparities.

The policy describes e-learning along a continuum from learning *about* ICTs (exploring what can be done with ICTs), learning *with* ICTs (using ICTs to supplement normal processes or resources) and learning *through* the use of ICTs, which refers to using ICTs to support new ways of teaching and learning (Department of Education, 2004, p. 20). It further states that learning through the use of ICTs is one of the best ways to achieve the national curriculum goals as it relates to a learner-centred approach. This supports active, exploratory and inquiry-based learning, collaboration between teachers and learners, critical thinking, and informed decision making, which suggests the generative use of digital technologies. The proposed continuum differs slightly from that articulated in Jonassen (1996), Hokanson and Hooper (2004) and Schifter and Stewart (2010) who linked learning *with/through* to the transformative use of digital technologies.

The White Paper (Department of Education, 2004) also outlines the following ICT development levels that describe teachers' proficient use of digital technologies: entry; adoption; adaptation, appropriation and innovation. At the entry level, the teacher is expected to be computer literate and able to teach learners to use computers. A teacher who is at the adoption level not only uses computers but also use other technologies for teaching and learning, administration and management. At the adaptation level, the teacher is competent to "use technology to enrich the curriculum and use integrated systems for management and administration" (Department of Education, 2004, p. 19). The teacher at the appropriation level should be able to function at the adaptation level as well as integrate technology into teaching and learning. Lastly, a teacher who is able to develop new learning environments that use technology as a flexible tool for collaborative and interactive learning is functioning at the innovation level. However, the concept of development levels as it relates to the competent use of digital technologies could be viewed as problematic as it ignores the fact that these technologies are unstable because they are rapidly changing (Koehler et al., 2013). This means that a teacher may be at the appropriation level with one operating system or application but at the introduction of a new software or piece of technology.

With increased access to and teacher use of digital technologies, the policy expresses the view that schools will become e-schools. An e-school is an institution with qualified, competent teachers who use ICTs for planning, administration and management as well as to enhance teaching and learning. Learners in an e-school use ICTs to enhance learning. The DoE therefore resolved to increase access to technologies, boost the capacity of managers and educators, and provide the highest quality ICT resources. The White Paper (Department of Education, 2004, p. 10) further states that any solution that is adopted needs to be cost-effective since “it is no use having state-of-the-art technology unless it can be sustained”.

In a country where many lack of digital access and with a scarcity of resources and an education system burdened by “egregious inequality” and with “dramatic diversity” (Tarling & Ng’ambi, 2016, p. 557), the e-education policy can be viewed as very aspirational. For instance, the policy states that “through appropriate technologies, it is hoped that South Africa will leapfrog into the new century, bypassing the unnecessary adoption cycle, and implement a solution that works now, and has the capacity to handle future developments” (Department of Education, 2004, p.10). Additionally, by linking students’ educational achievement and education reform to the integration of ICTs, a huge burden is placed on teachers for the success of the policy, and as the policy suggests, there are significant implications for the teacher.

The DoE subsequently published guidelines for teacher training and professional development to facilitate the implementation of its e-education strategy. These guidelines articulate a comprehensive approach to teacher development and incorporates a pedagogical dimension, a technical dimension and a collaboration and network dimension. The purpose of these guidelines was “to identify the ICT knowledge and skills that teachers require to integrate ICT into the curriculum to support curriculum delivery in specific contexts” (Department of Education, 2007, p. 5).

Guidelines for the creation of PLCs were published by the DBE (2019) and emphasise the importance of teacher professional development through collaborative teacher activities. Its aim is to address weaknesses in teacher capacity by providing quality continuous professional development, and it acknowledges that these activities are still organised as isolated, one-time

training events that lack any coherent strategy, monitoring and follow-up. It advises that PLCs should respond to teachers' needs to be relevant and effective.

In response to the priorities, targets and programmes of the National Development Plan, 2030, the DBE (2015) published its *Action Plan to 2019: Towards the Realisation of Schooling 2030*. This document presents the department's vision for education and e-education and reiterates the importance of e-education in creating fundamental change in the way schooling occurs. It expresses the wish that much of the learning that occur in the future will happen with the use of computers and that from Grade 3 onwards, learners will be computer literate. It also expresses the hope that computers in schools become an important medium through which learners and teachers access information (Department of Basic Education, 2015).

However, despite these policy undertakings, teachers still do not have the relevant skills to integrate digital technologies into their practices, and more importantly, their pedagogical practices continue to be largely teacher-centric, indicating a lack of transformation. The next section presents the findings of various studies that were conducted to understand the nature of digital technology integration, teacher preparation for integration and possible barriers to their adoption and integration.

3.6.3 Research into the Appropriation of Digital Technologies in South African Schools

Findings from various studies suggested that teachers' adoption and use of digital technologies do not match the aspirations of the e-education policy (Chigona, 2015; Dlamini & Mbatha, 2018; Du Plessis & Webb, 2012; Mooketsi & Chigona, 2014; Nkula & Krauss, 2014; Padayachee, 2017; Tarling & Ng'ambi, 2016).

Mooketsi and Chigona (2014) conducted a qualitative study in previously disadvantaged schools to investigate educators' perceptions of the success of ICT integration in teaching and learning. They found that there is a dissonance between the expectations of the government's e-education strategy and the practices of teachers. Nkula and Krauss (2014) revealed that in schools where teachers have access to digital technologies, the focus is on learning *about* computers or acquiring digital skills but that learning *with* ICTs or digital technologies is uncommon. A similar

observation was made by Tarling and Ng'ambi (2016) and Padayachee (2017). The former found that there is minimal growth in teachers' pedagogical uses of emerging technologies, and Padayachee observed that technologies are used to deliver content passively as there is a lack of technological pedagogical integration. So, instead of reflecting a continuum of use of technologies from learning *about* technology to learning *through* the use of technology, as is the expectation of the e-education policy, teachers' practices have still not evolved to become transformative. Instead, the initial introduction of digital technologies into the classroom are being treated as 'add-ons', despite the various affordances (Tarling & Ng'ambi, 2016). One possible explanation can be that newly qualified teachers are ill-prepared to integrate technologies into their teaching as their pre-service teacher training was done with traditional teaching methods (Chigona, 2015). Teachers therefore resorted to using the traditional approaches to which they had been exposed during their pre-service training. Tarling and Ng'ambi (2016) articulated a similar perspective, stating that most teachers who were trained in teacher-centric approaches will use the approaches used in their training. These views indicate that some barriers to the integration of digital technologies have their genesis in the pre-service training of teachers, confirming why the sustained professional development of teachers is vital.

Mooketsi and Chigona (2014) and Du Plessis and Webb (2012) highlighted several barriers to integration. The latter used Ertmer's (1999) classification of barriers to integration to frame the various barriers teachers faced. First-order barriers seen as those that are extrinsic include a lack of resources, adequate training and technical support and time while second-order barriers which are intrinsic include teacher beliefs, visions of technology use and teacher self-efficacy or lack of confidence. Du Plessis and Webb (2012) conducted a case study involving 30 teachers from six previously disadvantaged schools to discover teachers' perceptions about their and their schools' readiness to adopt digital technologies. The findings revealed first- and second-order barriers to technology. They found that there are insufficient computer-skilled teachers, in other words, not enough champions of technology, limited technological resources, and that teachers experienced time constraints due to large class sizes. In fact, support from the DoE was non-existent, especially regarding the provision of ongoing training activities. Apart from the above first-order barriers, the study indicated second-order barriers like a lack of computer skills and

“confidence related to learning computer skills”. These barriers prevent teachers and their schools from advancing beyond the initial integration phase. The fact that teachers’ professional development needs are not being met in a meaningful way was confirmed in an article by Dlamini and Mbatha (2018). They argued that schools are failing to provide adequate training to provide teachers with the necessary skills to integrate digital technologies into their classroom practices. This is despite the detailed *Guidelines for Teacher Training and Professional Development in ICT* (DoE, 2007) that specifies that “teacher development should be ongoing due to the changing nature of ICT” (p. 5) and that training “should provide teachers with contextualised learning experiences”, and hence, “be subject-specific and relevant to the learning areas” (p. 4). Instead, the current approach is “workshopping educators” (Dlamini & Mbatha, 2018), which is ineffective. Mooketsi and Chigona (2014) also revealed a lack of support for teachers to help them integrate ICTs into their teaching. A supportive environment, they posited, is key to schools transitioning to becoming e-schools, as stated in the government’s White Paper (DoE, 2004). Additionally, their study found that teachers derive their own symbolic meaning for the use of technologies, which are not always aligned with the goals in the White Paper on e-Education (DoE, 2004).

Padayachee (2017) conducted a study to get a snapshot of current and prospective ICT usage for teaching and learning. This study, which used both qualitative and quantitative data collection methods, took place in selected secondary schools in Tshwane South and involved 114 teachers. Padayachee found that the main barrier to integration is a lack of infrastructure or the inadequacy of the existing infrastructure. Other first-order barriers are teachers’ lack of preparation time, learners’ lack of access to devices such as tablets and smartphones, and learners not being digitally literate. The main second-order barrier is teachers’ lack of skills. Padayachee concluded that “there is a need for guidelines for ICT usage for both teachers and learners” as teachers demonstrated some level of uncertainty about how to proceed with ICT integration in their classrooms. She added that “the challenge not only lies with how to use the technology but how to integrate digital technologies effectively in the curriculum” (p. 57).

Tarling and Ng’ambi’s (2016) study of more than 321 teachers in both rural resource-constrained, urban well-resourced schools as well as pre-service education students interrogated teachers’

pedagogical practices with emerging technologies in order to develop a teacher pedagogical change framework. Their strategy was to map teachers' technology mediated interactions using Anderson's (2003a) interaction equivalency theorem and Bloom's digital taxonomy and use their findings to develop a diagnostic tool to change teachers' use of digital technologies. They found that in both urban and rural schools there is generally low use of emerging technologies in classrooms despite their availability. Urban teachers on the whole use emerging technologies less, but their overall pedagogical approaches are more transformative and learner-centric. Rural teachers, on the other hand, use emerging technologies more but with transmission pedagogies. Additionally, they indicated that while many urban teachers and education students show "transformative pedagogical dispositions", they need to change their pedagogical use of emerging technologies to be more learner-centric. Another finding was the low standard of activities set by teachers, which confirmed a finding by Hoadley (2012, cited in Tarling & Ng'ambi, 2016) that some teachers pitch tasks below learners' cognitive levels. Their findings also showed that teachers who use traditional pedagogical approaches tightly regulated learner activities, while those who used transformative pedagogies regulated classroom activities. Tarling and Ng'ambi (2016) also found that the CAPS curriculum greatly constrain teachers' pedagogical choices since its content and pacing are highly regulated. The rigidity of curricula in developing countries is an issue highlighted by Hennessy et al. (2010) in a study examining the factors influencing the use of ICTs in sub-Saharan Africa. They argued that a rigid and overloaded curriculum leaves little room for teachers to innovate in their classroom practices.

Thus, Tarling and Ng'ambi (2016) concluded that despite various professional development and policy initiatives aimed at bringing about sustained and widespread change in teachers' pedagogical practices, traditional transmission-based pedagogies continue to dominate in South African classrooms.

Drennan (2019) conducted a multi-case study exploring how five educational technology coaches assist five teachers to harness the affordances of iPads in their classrooms. This study was conducted in a technology-rich context with ubiquitous technology access for learners and teachers. A research-based model of an educational technology coach was proposed. However, the use of educational technology coaches may only apply in technology-rich settings that are

not financially constrained. This means that other strategies need to be developed to help teachers, particularly those in resource-constrained environments, to harness the affordances of the technologies available to them.

In conclusion, notwithstanding the increased access to digital technologies in schools and various policy initiatives emphasising the importance of integrating them into teachers' practices as well as efforts at providing, albeit haphazardly and insufficiently, pre-service and in-service teacher training, years of research concluded that teachers' pedagogical approaches with regard to their use have not transformed. Studies further confirmed that the goals of the government's e-learning strategy are far from being achieved, and more importantly, "the deployment of ICTs does not guarantee their efficient utilisation" (Department of Education, 2004, p. 10).

3.7 SUMMARY OF THE LITERATURE REVIEW

In this chapter, I outlined the various arguments from literature that were used to guide and inform the data analysis for this study. It was important to engage with different conceptions about the 21st century classroom to develop an understanding of the views of different scholars. The two key areas of focus for this study are teachers' appropriation of digital technologies in the classroom and their pedagogical strategies. Consequently, I presented Hokanson and Hooper's (2000) continuum of media use and literature on digital technology affordances, and in particular, Cope and Kalantzis' (2017) digital affordances, which were used to analyse teachers' appropriation of technologies.

I also engaged with Anderson's (2003) interaction equivalency theorem and Cope and Kalantzis' (2015) learning by design pedagogy framework to make sense of teachers' pedagogical approaches. While Anderson focused on different modes of interaction to create deep and meaningful learning in the classroom, Cope and Kalantzis (2015) outlined four main knowledge processes that help to transform the learning experience.

This study is set in the South African context and necessitated engagement with the CAPS curriculum and e-education policies as well as previous research investigating the different aspects of ICT or digital technology use in South African classrooms to paint a picture of the

context of the study. The various perspectives presented in literature helped develop an understanding of the 21st century learning environment and to create of a model that speaks to the South African context.

An investigation into the contemporary classroom also requires a research design and approaches that help provide a holistic view of teachers' practices. The next section therefore presents the overall research design and approach for the study.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

This study investigated the features of the 21st century learning environment and was designed with the assumption that multiple perspectives are needed to understand and analyse teachers' practices of appropriation of digital technologies and their pedagogical strategies. As such, a mixed methods approach was deemed most suitable to answer the main research question:

- What are the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences?

4.2 RESEARCH DESIGN

Mixed methods research is a field that is still evolving (Leech & Onwuegbuzie, 2009) and now includes a myriad of research designs, which adds to its complexity. It is defined as the collection, analysis and interpretation of qualitative and quantitative data in a single study or a series of studies where the same phenomenon is being investigated (Leech & Onwuegbuzie, 2009). Instead of giving one definition, Creswell and Plano Clark (2018) suggested that the key components of mixed methods research may include: Rigorous collection and analysis of qualitative and quantitative data to respond to research questions and hypotheses; the mixing of the two forms of data and their results; the use of theory and philosophy to frame the research process and; the researcher's organisation of the research process into explicit research designs that explain provide its logic and procedures.

Greene (2008, p. 20) offered a different perspective and stated that a mixed methods approach provides "multiple ways of making sense of the world, and multiple standpoints on what is important and to be valued and cherished". Greene's perspective fits with this study that argues for a mix of pedagogical strategies that speak to the multimodal ways in which learners make sense of the world and their diverse lived experiences. The conceptualisation of the study using multiple frameworks therefore underscores the value of using multiple approaches to make sense of teachers' practices.

Consequently, a mixed methods design fits with the pragmatic philosophical stance around which this research is framed. Johnson and Onwuegbuzie (2004, p. 14) posited that “a key feature of mixed methods is its methodological pluralism”, which makes it a suitable philosophical partner for mixed methods research, by leveraging the benefits of qualitative and quantitative approaches, thus providing the best means of answering research questions. Given the blending of qualitative and quantitative approaches, Creswell and Plano Clark (2018) posited that mixed methods research is associated with different philosophical assumptions or worldviews. The four worldviews highlighted are: postpositivist; constructivist; transformative and pragmatist. While post positivism regards reality as singular, the ontological stance of pragmatism is that reality is not fixed but is constantly being negotiated and interpreted. A pragmatist would therefore seek multiple means of knowing and multiple solutions to a research problem.

The learning by design pedagogy (Cope & Kalantzis, 2009, 2015), one of the two pedagogical frameworks for this study, evolved from the multiliteracies pedagogy framework (New London Group, 2000), which views the role of pedagogy as developing “an epistemology of pluralism” (New London Group 1996, p. 18) that foregrounds the importance of diversity. Tashakkori and Teddlie (2010) averred that diversity, is one of the main strengths of mixed methods. Consequently, pragmatism is the perfect philosophical match for this study and a mixed methods approach is best suited to answer its research questions as it privileges a diversity of methods and perspectives. A pragmatic approach also affords the application of both deductive and inductive thinking as the researcher combines qualitative and quantitative data (Creswell & Plano Clark, 2018). By combining both qualitative and quantitative research methods, the researcher is able to obtain a balanced and comprehensive perspective of the contemporary South African secondary school classroom.

This study employed Creswell and Plano Clark’s (2011) convergent design, previously referred to as convergent parallel design as a framework for planning, implementing and analysing the results. This typology is also called a concurrent mixed design (Leech & Onwuegbuzie, 2009; Tashakkori & Teddlie, 2003). Convergent design combines qualitative and quantitative results with the aim of comparing the results to obtain a comprehensive understanding of the problem being studied and to validate the two separate findings (Creswell & Plano Clark, 2018). This design

was chosen because the limited time available to me and the participants meant that data needed to be collected in one visit

This study emphasises the qualitative strand of the data and is thus represented by the notation QUAL+quan. Creswell and Plano Clark (2018) explained that “the relative priority (or importance) of the two methods within a particular study is indicated through the use of uppercase and lowercase letters” (p. 62), and the method that is prioritised is indicated by uppercase letters. Additionally, the use of + indicates that data collection occurs concurrently. Leech and Onwuegbuzie (2009) referred to the above approach as a “partially mixed concurrent dominant status design”, which involves current data collection that can emphasise either facet.

4.3 SAMPLING AND RESEARCH SITES

Since it was impossible to observe every teacher in every classroom context to draw conclusions about the key features of the 21st century South African secondary school classroom, research sites and participants had to be carefully selected. This study thus relied on two types of non-probability sampling, namely availability or convenience sampling and purposive sampling. Scott and Morrison (2005, p. 220) stated that “non-probability sampling occurs when a person or thing to be sampled from a larger population does not have an equal chance of being selected”.

Participating schools in the Johannesburg area were selected because they were easily accessible to me. Consequently, convenience sampling was preferred. According to McMillan and Schumacher (2010), convenience or available sampling is the selection of research participants for expediency and accessibility. Schools were first engaged via email communication, and an email was sent to 18 secondary schools inviting them to participate in the study. There was follow-up via telephone and email. There were subsequent meetings with the principals, deputies, and in one instance, a member of staff designated by the principal to provide additional details about the study and discuss administrative issues such as the distribution of learner assent forms. In two of the schools, the subject teachers requested to meet with me to learn more about the research prior to the commencement of data collection.

The intention was to have a total of six research sites that consist of two government schools, two well-established independent schools and two newly established independent schools in order to obtain a representative sample of the different groups of secondary schools. However, the newly-independent schools were reluctant to participate in the study. The Chief Executive Officer of one of the schools agreed to meet and be interviewed but did not give permission for his teachers to participate in the study. Consequently, there were only five participating schools, two government schools and three private schools, whose participation was ultimately due to their availability.

Research sites were also selected using purposive or purposeful sampling as schools were chosen because of their use of digital technologies for teaching and learning. Purposive sampling is when participants are selected who can provide information about the topic being studied (McMillan & Schumacher, 2010). The general criterion for the selection of the research sites was that they must all have access to and use digital technologies since the underlying assumption of the 21st century contemporary classroom is that the use of digital technologies is an integral aspect.

The rationale for expanding the scope of the study to include the entire academic staff in the questionnaire was to obtain a wider cross-section of perspectives as it was not possible to observe every teacher in their classroom setting nor interview them. This inclusion of a larger group of teachers made it easier to generalise the findings of the study. However, this study did not ignore the vast delta, particularly in terms of access to resources, between schools and school contexts, but posits that in spite of their differences, there will be features that transcend contexts and are applicable to different settings.

4.4 RESEARCH PARTICIPANTS

The principals of the various schools were sent an email seeking permission for data collection at the various schools and to be interviewed as part of the data collection process. Confirmation emails were sent to me by the schools' administrations. Two groups of participants were drawn from the five participating schools. Qualitative approaches are generally aimed at studying small groups of individuals, thereby allowing for the in-exploration of perspectives. On the other hand,

the quantitative understanding emerges from an examination of a larger number of participants and assessing their responses to pre-determined variables (Creswell & Plano Clark, 2018).

4.4.1 Qualitative Participants

English and History teachers in Grades 8 and 9 as well as the Head of IT/Innovation were asked by the school leadership to participate in the study. Those who agreed signed the consent form (Appendix B2) along with the cover letter. For this facet of the study, 10 English and History teachers (nine females, one male); five principals (three males, two females); five Heads of IT/Innovation (three females, two males); and one Head of Enrichment and Growth Curriculum, participated. In two of the private independent schools, the designation of the Head of IT had been changed to the Head of Innovation, Design and Technology, and in the other it was changed to Head of Innovation, Staff Training and IT Services. Teachers' years of employment at the various schools ranged from one term to 25 years.

Since learners were passive participants, consent letters were sent to them as well as assent forms advising them of the study and requesting their permission. Information letters were also sent to their parents. The schools' administration facilitated this process by sending letters via email or hard copies to parents, and most were returned as hard copies with a few being emailed by the schools.

Table 4.1 presents a profile of the qualitative research participants

Table 4.1: Profile of the qualitative research participants

SCHOOL	NUMBER OF YEARS AT SCHOOL			
	Principal	History	English	Person responsible for IT/Innovation
Queenstown College	12 years	4 years	3 years	2 years
Duke's College	6 years	3 years	1 term	8 months
Hampton High	6 years	6 years	2 years	25 years
Southridge High	16 years	14 years	14 years	15 years
Baker High	1 term	5 years	13 years	11 years

4.4.2 Quantitative Participants

The quantitative data was collected via a survey questionnaires that were shared with the academic staff of the participating schools. This was again facilitated by the schools' administration. A total of 301 teachers were surveyed ($n = 301$), and 176 teachers ($n = 176$) completed the questionnaires (74% male, 26% female), yielding a 58% response rate (Chapter 6 provides more detail about the participants in this aspect of the study).

4.5 RESEARCH INSTRUMENTS

Since this was a mixed methods study, data collection involved both qualitative and quantitative methods and both sets of data were collected concurrently. Figure 4.1 shows the data collection and analysis process followed for this study. This diagram was adapted from Creswell and Plano Clark's (2011) convergent model.

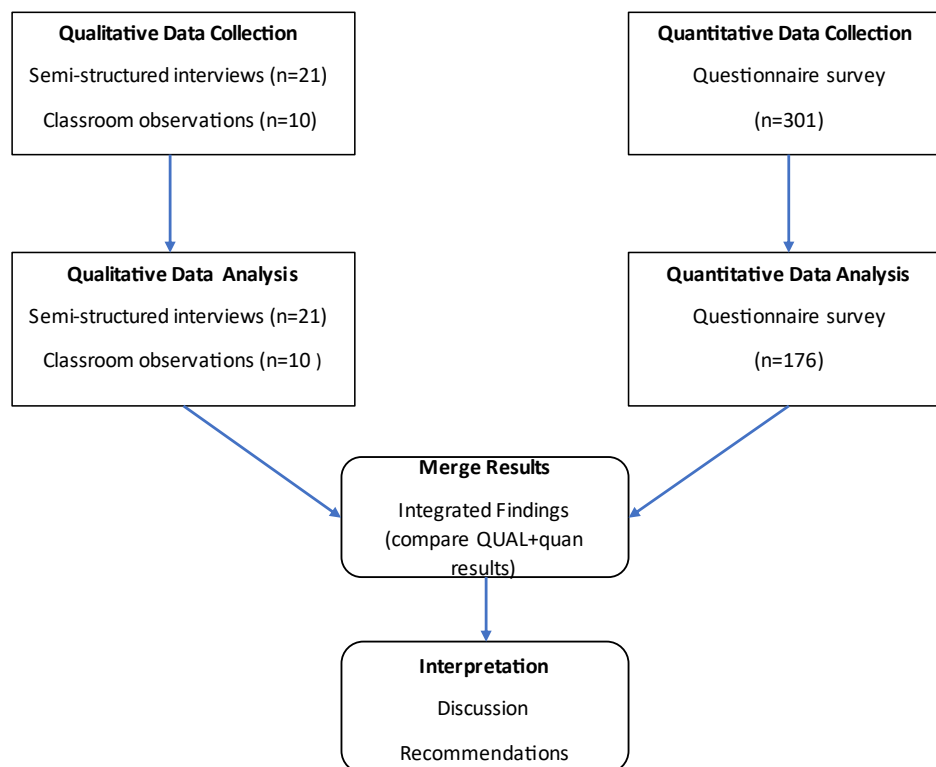


Figure 4.1: Summary of the data collection and analysis process (Adapted from Creswell & Plano Clark, 2011)

4.6 QUALITATIVE DATA COLLECTION

Qualitative research helps the researcher to see the world from the participants' perspective and to see how their perspectives are shaped by and shape their physical, social and cultural contexts (Maxwell, 2013). Since the main research problem related to poor pedagogical strategies, particularly linked to the use of digital technologies, a key focus for data collection was conducting detailed classroom observations to interrogate teachers' practices. Consequently, priority was given to the qualitative data with interview and observation data mainly used to answer the second sub-questions: Which pedagogical strategies do teachers need to employ in order to produce rich learning experiences in the contemporary learning environment?; and How is the epistemological diversity of learners being privileged through teachers' pedagogical choices?

4.6.1 Data Collection Timeline

It was envisaged that between four and six weeks would be spent in each classroom, but the way the various terms and timetables were structured in the five schools and teacher availability meant I spent three to four weeks at each research site. However, this did not compromise the integrity of the data collected. In addition, the times spent in each classroom varied depending on the number of lessons per week and the number of lessons allocated for each subject per week.

Data collection therefore lasted approximately six months from February to May and from September to October 2019 and the interview with the principal of Queenstown College was conducted in November 2018.

4.6.2 Classroom Observations

McMillan and Schumacher (2010) argued that observation is a key data collection strategy and the backbone of qualitative research. They added that it is a way for the researcher to observe naturally occurring behaviour in a research site. Non-participant classroom observations were conducted in the 10 secondary school classrooms of the five participating schools to gain insight

into the teachers' daily practices and observe the physical and sociocultural context of the classroom. Prior to the commencement of these observations, the teachers shared their timetables with me, except in one case where this was not done until the first day of observations.

Classroom observations were guided by an observation schedule (Appendix D) that contributed to the overall analysis of the data, revealing a picture of the various levels of interactions occurring in the classroom, the knowledge processes used, and how teachers appropriated digital technologies.

In order to be as unobtrusive as possible and not influence classroom activities, I sat in a corner at the back of the class. From this vantage point, I was able to observe when learners were 'off-task', especially with regard to their use of technology. During classroom observations detailed notes were taken of the classroom activities, and in some cases, these were verbatim, depending on the speed of the verbal interactions in the classroom.

In all the schools, there were more English lessons than History lessons. In the private schools, each lesson lasted between 45 and 55 minutes and in the government schools, the lessons lasted between 30 and 42 minutes. Table 4.2 shows a breakdown of the time spent in each classroom and the number of lessons observed. Each school is represented by its pseudonym.

Table 4.2: Breakdown of time spent in classrooms

SCHOOL	HISTORY	ENGLISH
Queenstown College	515 minutes (10 lessons)	542 minutes (10 lessons)
Duke's College	340 minutes (8 lessons)	485 minutes (11 lessons)
Hampton High School	(6 lessons)	350 (10 lessons)
Southridge High School	255 (7 lessons)	445 (12 lessons)
Baker College	345 (9 lessons)	495 (12 lessons)

4.6.3 Semi-Structured Interviews

Merriam and Tisdell (2016) stated that interviews are essential, especially when it is not possible to observe the behaviour and feelings of participants or their interpretation of the world around

them. Therefore, the purpose of interviews is to discover things we cannot observe directly (Patton, 2002).

One-on-one semi-structured interviews were conducted with the principals and teachers at various points of the data collection process, depending on their availability. These were guided by a prepared list of questions comprising the interview schedule found in Appendix C. Merriam (2009) suggested that the quest of a qualitative researcher is to understand the meanings that people have constructed about the world. Consequently, the questions that guided the conversations with the principals and teachers were aimed at obtaining information about their use of digital technologies in the classroom, their pedagogies as well as their perspectives on the classroom of the future.

In cases where the interviews were conducted toward the end of the observation process, I was able to ask questions based on what was observed during the lessons. Semi-structured interviews are described as flexible and adaptable and less formal than structured interviews, which makes it easier to build a rapport with teachers (Merriam, 2009). One challenge encountered, however, was arranging interviews with teachers who had busy schedules, and hence, found it difficult to agree to a convenient time for the interview. For instance, I was only able to interview the History teacher at Hampton High School when one of her classes was completing a formative assessment. It was the final week of classroom observations, and I was due to commence observations at another school. Consequently, she had to agree to conducting the interview during that lesson.

All the interviews were audio-recorded for precision and transcribed by me.

4.7 QUANTITATIVE DATA COLLECTION

Quantitative research is used “to explain phenomena by collecting numerical data that are analysed using mathematically based methods” (Aliaga & Gunderson, 2000, cited in Muijs, 2011, p. 1). Muijs (2011) added that it is “good at providing information in breadth from a large number of units” (p.7). Given my desire to expand the scope of the study to obtain the perspectives of the entire academic staff of the participating schools, a survey questionnaire was designed and

shared with them. Although this was the secondary strand of the data, it supported the qualitative data, added to the overall richness of the data and helped to answer the research questions. The bulk of the quantitative data focused on teachers' access to and use of ICT, and hence, helped answer the first research question: In which ways have digital technologies been appropriated within the classroom to transform teaching and learning?

This study used a 5-point Likert-scale questionnaire with 12 statements containing the options *never, rarely, often, sometimes, and all the time*. According to Neuman (2006, p. 207), "a scale is a class of quantitative data measures often used in survey research that captures the intensity, direction, level or potency of a variable construct along a continuum". The questionnaire was administered using either Google Forms or Office 365 Forms, based on the schools' preferred digital platform. The questions included general information, such as participants' gender and number of years teaching; access to pre-service and in-service training; their access to and use of digital technologies; their perspectives on 21st century skills; and interactions within their classrooms. The survey questionnaire was sent to the teachers via the schools' administration or a member of staff designated by the school's administration.

4.7.1 Response Rate

Survey response rates are very important as they can impact the validity of the data collected. Nulty (2008) confirmed that response rates for online surveys are generally much lower than for traditional paper-based surveys. In one example cited, there was a gap of 23% between the response rate of a paper-based survey (56%) and an online survey (33%). The response rate for this study, which was conducted online, was 58.5%, with the highest percentage being 86,1% and the lowest, 31,3%.

4.8 DATA ANALYSIS

According to Merriam (2009, p. 176), "data analysis is a complex process that involves moving back and forth between concrete bits of data and abstract concepts, between inductive and deductive reasoning, between description and interpretation". This iterative process helps to make sense of the data, which is transformed and condensed into findings. Thus, interpretation

and transformation are crucial to data analysis. Since this is a mixed methods study, data analysis involved thematic analysis of the qualitative data and descriptive analysis of the numerical quantitative data.

4.8.1 Qualitative Data Analysis

Merriam (2009) suggested that “analysis begins with the first interview, the first observation, the first document read” (p. 165). This process becomes more intense as the study progresses and data from interviews, observations and documents are combined into larger themes (Merriam & Tisdell, 2016). In this way, tentative categories are created using small chunks of data as the researcher continuously looks for patterns. Recurring patterns and regularities are then translated into themes from the generated codes and categories. Punch (2009, p. 175) posited that “coding is the starting activity in qualitative analysis (and) is the key to discovering regularities in data”. This describes the inductive process of qualitative data analysis.

Figure 4.3 shows Creswell’s (2012) diagram of the qualitative process of data analysis that was used to analyse the qualitative data from this study. This largely bottom-up, iterative and inductive process commenced as soon as the first set of data was collected.

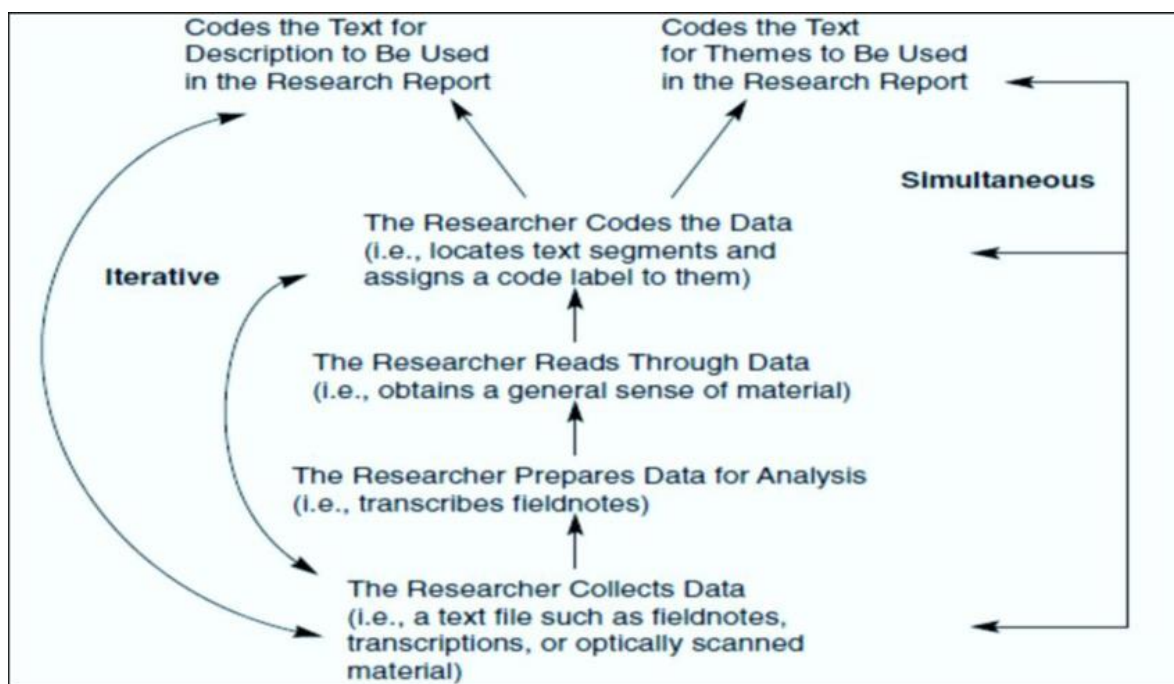


Figure 4.2: Diagram of qualitative data analysis process (Creswell, 2012)

Transcriptions commenced soon after the first interview was conducted in November 2018. This approach continued as transcripts were created immediately after the interviews were conducted and classroom observations concluded. When this process was concluded, I read through the interviews to get a general sense of what was being said and then commenced the process of open coding to see what categories would emerge from the data. Strauss and Corbin (1990, p. 28) described open coding as the “unrestricted coding of data” by “scrutinizing the fieldnote, interview or other document very closely: line by line or even word by word” in order to “produce concepts that seem to fit the data”.

As I read through the interviews, I highlighted key phrases and parts of text that were of particular interest to the research before assigning codes. This included ‘in-vivo’ codes, which are “terms used by people who are being studied” (Strauss & Corbin, 1990, p. 30). Using the ‘Review’ tab in Microsoft Word, these codes were then placed in the margins of the text, resulting in a long list of codes. A table was subsequently created in Microsoft Excel with themes that had emerged inductively from the codes and also deductively with the guidance of the research questions. Creswell (2012) described the use of both an inductive and deductive approach as the process where pattern, categories and themes are built from the bottom up and where data are organised into more abstract units of information. He added the following:

This inductive process illustrates working back and forth between the themes and the database until the researchers have established a comprehensive set of themes. Then deductively, the researchers look back at their data from the themes to determine if more evidence can support each theme or whether they need to gather additional information. Thus, while the process begins inductively, deductive thinking also plays an important role as the analysis moves forward.

Apart from themes being generated from the codes, as Creswell’s (2012) model in Figure 4.3 suggests, the data were coded for descriptions that were used in the writing up of the findings in Chapter 5.

4.8.2 Quantitative Data Analysis

Quantitative data analysis refers to the techniques used by researchers to convert data to numerical form and apply methods of statistical analysis. The purpose of which is to reduce data to an intelligible and interpretable form in order to make links to the research problems, test hypotheses and draw conclusions (Rubin & Babbie, 2005 in De Vos et al., 2011).

Since the questionnaire was created using Office 365 Forms and Google Forms, the raw data were converted into bar and pie charts in the application in preparation for analysis. Descriptive analysis was conducted for each of the variables as the data was explored to assign the mean and standard variation and check for variance. Descriptive statistics, also referred to as summary statistics, help to “transform a set of numbers or observations into indices that describe or characterize the data” (McMillan & Schumacher, 2010). They are therefore used to summarise, organise and reduce large pieces of data, helping to interpret the quantitative data. The statistical results from the survey responses were summarised and organised into text, tables and figures in preparation for interpretation.

4.8.3 Merging the Results

A significant aspect of the convergent mixed methods design is merging the qualitative and quantitative data to look for areas of convergence and divergence. Consequently, after analysing both the qualitative and quantitative data, the findings were integrated in order to interpret the results. The integrated findings were examined based on key literature to provide a rich understanding of teachers’ practices and in the process reveal the characteristics of the 21st century learning environment.

4.9 VALIDITY AND RELIABILITY

Reliability is “the extent to which research findings can be replicated” (Lincoln & Guba, 1985, in Merriam, 2009). Maxwell (2013) likened reliability to dependability, consistency and replicability. This means that if the study were to be repeated or conducted with a similar group of respondents in a similar context, the findings would be similar. This is definitely true for this

study. External validity means that the study can be applied to other situations. This also speaks to its generalisability. To some extent, one would be able to make generalisations about some of the findings of the study as school contexts differ.

Given that this study used a mixed methods approach, the use of both qualitative and quantitative methods for data collection and analysis allowed the inclusion of multiple perspectives about the 21st century classroom, and by so doing, increased its validity and reliability. This also reflects the process of triangulation, which is “comparing and integrating data collected through some kind of qualitative method with data collected through some kind of quantitative method” (Patton, 2002, p. 556). Patton (2002) added that triangulation allows the phenomenon being studied to be examined in diverse ways, thereby adding to the credibility of the findings and strengthening the conclusions. The use of multiple methods and multiple sources of data also allows for the comparing and cross-checking, which is two of the four types of triangulation (Patton, 2002; Merriam, 2009).

Onwuegbuzie and Leech (2006b, p. 234) defined internal validity as “the truth value, applicability, consistency, neutrality, dependability and/or credibility of interpretations and conclusions within the underlying setting or group”. This contributed to the study’s trustworthiness.

4.10 TRUSTWORTHINESS AND CREDIBILITY

Merriam (2009, p. 209) emphasised that research findings are deemed trustworthy based on the rigour used when conducting the research. I was meticulous in recording information and capturing classroom activities with relative precision in order to ensure the trustworthiness of the findings. Audio recording the interviews and verbatim transcriptions of what was said during the interviews helped to enhance the credibility of the findings. These contributed to the thick descriptions found in the analysis chapter.

4.11 ETHICAL CONSIDERATIONS

This study was conducted in accordance with strict ethical standards. Before commencing data collection, ethics approval was sought and granted by the Ethics Committee of the University of the Witwatersrand. There is a copy of the ethics approval letter (Protocol Number 2018ECE011D)

in Appendix A. Subsequently, permission was sought and received from the Gauteng DoE to conduct the study in the two public schools (Appendix B). This was communicated to the principals of the participating schools via email, and permission was received via email.

An email was also sent to the principals of the private schools, and their permission was also received via email (Appendix B1). Consent letters were then sent to the participating teachers seeking permission to conduct interviews and audio record these conversations as well as to observe their lessons (Appendix B2). The permission was granted through their signed consent.

Learner assent forms were given to the schools prior to classroom observations asking learners' permission to be observed and explaining that this was confidential (Appendix B4); the permission was granted.

To protect participants' anonymity and confidentiality, pseudonyms are used for the teachers' and the schools.

All signed forms and field notes are stored in a cupboard in my home and transcripts and recordings of the interviews are stored on OneDrive on my laptop, which is password protected. These will be destroyed five years after data collection.

4.12 SUMMARY

This study used a mixed methods approach based on Creswell and Plano Clark's (2011, 2018) convergent design. As such, qualitative and quantitative data collection methods were used with multiple data sources in the form of classroom observations, semi-structured interviews and a questionnaire survey. The use of multiple methods and data sources contributed to the validity and reliability of the study. The research sites were five public and private schools in Johannesburg.

CHAPTER 5: QUALITATIVE FINDINGS

5.1 INTRODUCTION

This chapter presents the findings from the qualitative data collected from five Johannesburg secondary schools. This data was collected during interviews with the History and English teachers as well as observations of their classroom practices; interviews with the principals of each school; and interviews with the Heads of IT and in some cases, the Heads of Innovation and at one school the Head of Enrichment. Analysis of these findings helped to answer the main research question:

- What are the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences?

In each school, Grade 9 History and English classes were observed for an average of three to four weeks, except for Queenstown College where one Grade 8 and one Grade 9 class were observed as the Grade 9 History teacher did not agree to be observed. Hence, a total of 10 different classrooms were observed, totalling 55 English lessons and 40 History lessons. Fewer History lessons were observed as there are generally two History lessons per week in all schools while there are between three and five English lessons per week. Sixteen subject teachers and five principals were interviewed. In Queenstown College, I also interviewed the Head of Enrichment, formerly the Life Orientation teacher, who is the coordinator of the integrated growth curriculum that was launched during the year of the observations.

In keeping with research ethics, participants' names and the school names were not used, and they were given pseudonyms, which are set out in Table 5.1.

Table 5.1: Pseudonyms of research participants

Participants	Queenstown College	Duke's College	Hampton High School	Southridge High School	Baker College
English Teacher	Liselle	Marie	Palesa	Mariette	Lauren
History Teacher	Cathy	Alice	Stacey	Natasha	William
Principal	Lynne	Rupert	George	Anton	Ilana

Participants	Queenstown College	Duke's College	Hampton High School	Southridge High School	Baker College
Person responsible for technology	Tracey	Liam	Paul	Megan	Yvette
Other	Belinda: Head of Enrichment				

Given the lengthy designation of the persons responsible for technology at Queenstown and Baker Colleges, they are referred to as 'Head of Innovation' throughout the study. Additionally, the term 'college' is used for private schools and 'high school' for public schools, and in the extracts from classroom observations, teachers' interactions are represented by the digit '1' and learners' interactions by the digit '2'.

The findings for each school are presented under the following headings:

- School context
- Digital technologies in X school
 - Appropriation of digital technologies in the History classroom
 - Appropriation of digital technologies in the English classroom
- Teachers' pedagogical practices
 - Patterns of interaction in the History classroom
 - Learning by design in the History classroom
 - Patterns of interaction in the English classroom
 - Learning by design in the English classroom
- Teachers' perceptions of the 21st century classroom

In the sections on the appropriation of digital technologies, the findings are based on classroom observations in the History and English classrooms and data from the semi-structured interviews with their teachers. Instances of representative and generative use indicating opportunities for learning from, about and with technologies are highlighted along with the harnessing of various digital affordances.

Teachers' pedagogical practices were examined using Anderson's (2003a) interaction equivalency theorem and the learning by design pedagogical framework (Cope & Kalantzis, 2015). Examples of teacher-student, teacher-student-content, student-student and student-

content interactions are highlighted together with the enactment of the knowledge processes of conceptualising (by naming and with theory), experiencing (the known and the new), analysing (critically and functionally), and applying (appropriately and creatively).

The principals' and teachers' perceptions of the 21st century classroom are presented in the final section after which a summary of the chapter is given with a summary table of teachers' appropriation of digital technologies and their pedagogical strategies.

5.2 QUEENSTOWN COLLEGE

5.2.1 Context

It is the second week of the first term of the school year. I arrive at the recently built, large multipurpose hall in which I will be observing my first lesson. The room is partitioned by stackable walls, allowing it to be divided into three separate spaces or to be opened up into one large space, like it is today. Mounted on the ceiling at the far ends of the room are two data projectors, facing large white screens. On each wall there are two speakers, and at one end of the room is a small podium with a lectern that houses the digital controls for the technology in the room.

An excited group of girls arrive for their lesson. It is the very first lesson for that particular module of the new growth curriculum integrating History, Art, Drama and Music. The four subject teachers arrive, and they usher in the 87 girls who are waiting outside. They enter and sit in groups of eight at large, rectangular white tables with a white board surface on which students can brainstorm and write. The History teacher greets the girls and the lesson begins.

Queenstown College is a well-resourced, technology-rich private school in Johannesburg that has both a junior and senior school. At the time of observations, the senior school had about 375 learners and 50 teachers. The principal, Lynne, had been at the College for approximately 13 years; Tracey, the Head of Innovation, Design and Technology, formerly the Head of IT, had been at the school for just under 2 years; Cathy, the History teacher whose class I observed, had been

at the school for just under 5 years; and Liselle, the English teacher and Head of Grade 9 English, had about 4 years' experience at the school.

In my interview with the principal, she highlighted three significant changes undertaken since her tenure as principal: transformation of the Grade 8 & 9 curriculum; transformation of the school in terms of diversity; and the introduction of the iPad which the principal stated was a major shift that was initiated six years prior to classroom observations at the College.

The change in curriculum she mentioned refers to a growth curriculum for the College embarked on for Grades 8 and 9 at the beginning of 2019. This is an integrated approach to teaching that moves away from separating subjects into silos and was referred to by the principal as “*a big shift*”. Individual subjects for the Grade 8 and 9 classes were changed to modules with four core subjects: English; Afrikaans or isiZulu; French (languages) and Life Orientation. For example, the Grade 8 History lessons that were observed were part of a module with Art, Drama and Music. The chosen theme was Revolutions, which meant that the Music lessons focused on music during the time of revolutions and Art and Drama did likewise. The one module was therefore taught by four different teachers working closely together.

One of the main reasons for the integrated approach is to show learners the interconnectedness of the different subjects. Ertmer (1999) advanced this idea and argued that it is important for learners to see connections between subject areas. The principal added that the new curriculum represents a very structured and blended approach to learning. Different teachers take on different roles as the need arises, and as she further explained,

One of the modules the Grade 8s are doing is a module called 'foodology'. Then you might have for instance the Natural Science teacher giving input on that in a particular way, going out doing some experimentation or very much more experiential learning... Once the Natural Science teacher has given input, you might have the geography teacher coming to talk about resources and food shortages ... so it's an integration and it is blended.

However, this new curriculum was not implemented in the older grades (Grades 10–12) because, as Lynne stated, “*we are still teaching towards a matric exam, so we need to work back from that*

to make sure that the skills are covered in Grade 8 and 9 that are required for Grades 10, 11 and 12”.

In my conversation with the Head of the Growth Curriculum, who is also the Head of Enrichment, formerly Life Orientation, she stated that one of the main aims of this integrated curriculum is to make learners ‘future-ready’. She added that this involved the school administration *“grappling with questions like, what do we mean by 21st century education”*. Before embarking on the new curriculum, a group of senior teachers examined *“best practice locally and internationally and generally looking at educational trends”*. She added, *“we worked backwards from the skills that we wanted to develop by matric, what ... conceptual understandings do students need to have in Grade 10 to be able to choose those subjects and then scaffolding it down from that”*.

Another important aspect of the new Grade 9 integrated curriculum is the subject Philosophy for Children, which replaced Life Orientation, which was once an important learning area in the curriculum of South African schools. Philosophy for Children is a continuation of the critical thinking programme of the school that starts in junior school and is aimed at teaching children to think critically and interrogate different points of view. Since this is part of the integrated curriculum, the Head of Enrichment stated that a number of staff members were trained in Level 1 Philosophy for Children so that it is not an isolated subject and the principles are integrated into other learning areas.

Queenstown College has also embarked on a ‘Transformation, Diversity, Inclusion’ initiative as a way of intentionally addressing issues of diversity, transformation and inclusion in the school. According to the principal, this is one of the most important policy changes in recent years. According to the History teacher, this initiative is aimed at making the College more diverse, and as a way to remind teachers to be more inclusive in our subjects. She added that *“being made aware that you’ve got different people in your class, different children in your class, from different backgrounds”* is an aim of the programme.

The principal highlighted that another major shift that has occurred at Queenstown College is the introduction of iPads in 2010 as the main technology device. As a result of these major shifts, teacher professional development to develop teachers’ pedagogical skills and technological skills

occur weekly. The next section examines the appropriation of digital technologies at the College in general.

5.2.2 Digital Technologies at Queenstown College

The use of digital technologies is quite central to teaching and learning at Queenstown College, and as a result, there is an IT policy that covers usage and disciplinary issues, according to the principal.

The College uses the Apple platform and teachers upload curated teaching materials, lessons, and assignments on to iTunes U, which is an application that integrates, manages and coordinates all classroom activities. The school also uses the Microsoft Platform with Office 365 applications. Each teacher was provided with an iPad and a MacBook for pedagogical use. Since the shift to using iPads in the classroom, it became compulsory for learners from Grade 6 to Grade 12 to have an iPad. However, according to Tracey, learners are forbidden from using smartphones. Lynne, the principal, stated that since the initial introduction of the iPad,

I think that that pendulum has kind of swung completely to sort of all iPad, and now it's kind of centred a bit. I think the girls now use technology as a part of their learning, rather than an add-on, rather than something that they have to be doing ... I think that most teachers use it that way now as a teaching tool. So iBooks, you know, using the iPad in the classroom have become really integrated as part of how you teach so it's no longer how should I use technology, it is more I'm using technology in the classroom as a standard pedagogical approach basically and so how do I do that.

Tracey outlined the plethora of digital technologies used in the school, which include Lego robotics kits; spherobolts, which is a spherical robotic device used, for example, for coding in life sciences, to trace the circulation of blood in the body; and MimioTeach devices, which are portable bars that can be attached to a regular white board with the appropriate software and pen, which is calibrated so that a regular white board can function as an IWB. She further mentioned that a few classrooms are fitted with older interactive smart boards, which are still being used by a few teachers but that the school had opted for MimioTeach, which will eventually

replace the interactive smartboards that have become expensive, and as Tracey advised, “software upgrades for that specific model were no longer possible”. In a conversation with the Grade 9 English teacher, she stated that she really wanted a smartboard but was told that she needed to give reasons why she needs it.

Despite the range of digital technologies available, Tracey argued that the most essential are the data projector, iPads, laptops and reliable Wi-Fi. She advised that the school does not have a computer laboratory but that there are plans to set up one soon, especially for the learners taking IT as a subject, which had been recently introduced into the curriculum.

In terms of teachers’ integration of digital technologies, the principal categorised them into three groups: the early adopters; the group in the middle, and reluctant users. She stated,

You always get your early adopters; you always get your people who jump on and are keen. But there’s often the early adopters, the people in the middle, waiting, is this really necessary for me to teach? Is it enhancing my lesson or is just there as an extra, and then you get those people who are, staff who are reluctant and changing them is really, really hard?

IT coordination and teaching are done by the Head of Innovation, Design and Technology, who uses an Apple MacBook connected to a television screen to teach her lessons. She provides some level of support and training to teachers, but most of the technical IT support is outsourced. She argued that “support is important or teachers have to become experts; if not, it becomes time consuming. One tech teacher at the school cannot be everywhere”.

Continuous training in the use of digital technologies is provided to teachers. Lynne stated that their training system is not perfect but that it is done on a regular basis. The activities happen once per week and are generally conducted by the Head of Innovation, Design and Technology. Individual teacher learning is also encouraged. During our interview she stated,

We’ve been having training individually with staff, at staff meetings. We’ve encouraged all the staff who’ve got MacBooks to become Apple accredited teachers, to go through that course. The Microsoft Platforms have been there. We’ve been using them for a long time. ... It’s not to say that we had a perfect training system before, but we would make

time. On a Thursday morning we generally had a normal form period and we would try then to give our staff some kind of training. So, this has been going on for years.

She expressed the view that it is necessary for time to be set aside for teacher learning since it is unreasonable to expect staff members given the demands on their work to have the time. She reiterated, “*you’ve got to give them the time to train*”. Most of the teachers are Apple accredited teachers and many had also received training in Microsoft Applications.

Whenever there is extended staff training, according to Tracey, a flipped classroom approach is applied where learners are given activities to be completed at home while the teachers are doing the training. Tracey advised that work is usually emailed to learners or uploaded onto the iTunes U platform for them to do at home.

Computer literacy classes for all learners commences at primary level and continues to the College where the activities are more focused and integrated. This involves them learning how to set up the applications used in their lessons as well as how to use technology safely. Tracey indicated that,

The training on how to use tech is integrated, for example, with the Foodology module in the Grade 9s. I teach them how to create an Excel spreadsheet because they are learning how to create a budget. They learn how to create video content, and I’m giving them life skills on how to create their own content. I’m going to teach them how to do subtitles in their videos in French, Zulu and Afrikaans.

This approach to computer literacy reflects Jonassen’s (1996) view that the teaching of such skills should be contextualised.

Learners are also given numerous other opportunities to use digital technologies for special projects. One such project is an annual advertising award project undertaken by the Grade 9 English classes in which they create a digital advertisement based on a given theme. This annual event involves learners working in groups and using their iPads and other available technologies to create multimodal advertisements. It is coordinated by Liselle, whose English lessons were observed. This activity was not observed since it was undertaken outside of the period of

observation, but the results and the winning advertisements were posted in the school's monthly newsletter and on their Facebook page.

In conclusion, the overall approach indicates the diverse use for digital technologies with opportunities provided for learners to learn *from*, to learn *about* and to learn *with* computers, thereby demonstrating both their representative and generative use.

The next section examines the appropriation of digital technologies in the History and English classrooms.

5.2.2.1 Appropriation of digital technologies in the History classroom

At the time of the classroom observations, Cathy had been teaching at Queenstown College for 4 years and has had the opportunity to attend weekly teacher learning at the school as well as attend an iPad course outside the school.

The lessons observed occurred at the beginning of the first term of the school year with learners in their first year of secondary school. Most of them had progressed from the primary school and a minority were new to the school. Grade 8 History was observed as part of a combined module with Art, Drama and Music. Four of the lessons observed were with the entire Grade 8 group, and the other six were with one individual Grade 8 class. Two of the combined lessons took place in the large multipurpose hall, another in the gymnasium and the fourth was held in the main school hall. Individual lessons were held in the History classroom, which is equipped with a smartboard at the front by the teacher's desk, a white board on one of the side walls, two speakers and a data projector. The History teacher used an Apple MacBook and an iPad.

On the first day of classroom observations, as soon as the learners had settled, they were told to take out their iPads and to log on to the iTunes U course. Those who had not yet enrolled in the course were told to do so and then they were asked to search for the Revolutions module and download the content for each subject in the module. Some learners were having difficulty logging on to the course and the teachers remarked the Wi-Fi was slow because of the number of learners who were logging on at the same time. Learners who were able to log on were advised to AirDrop the content to their friends. One of the teachers then sought the assistance of another

teacher who was more familiar with the technology. Table 5.2 is an extract showing how the lesson unfolded.

Table 5.2: Lesson 1: Revolutions module

Lesson 1: Revolutions module <i>Teacher 1; learners 2</i> Introduction: <i>(The girls are told to settle down. This takes a while as it's the first lesson of this module. The teachers take turns to present their aspects of the module)</i> 1. The History teacher says that the content is available on the iTunes course. - The learners are told to log on to iTunes U on their iPads and to enrol in the course. They then have to search for the Revolutions module and download the content. - Those who haven't yet enrolled in the course were told to do so. <i>(The four teachers walk around to check that the girls are able to log on and enrol)</i> 1. Some learners are having problems accessing the course as the Wi-Fi is slow. <i>(A few learners at the desk closest to me take out their phones; the Art teacher tells them to put away their phones)</i> 1. One teacher says, "if you can't download something, your friend can AirDrop it". - Another says that some versions of the course might have been updated so she suggests that the learners delete the App then reinstall it. 2. Some of the girls who re-installed the app are able to log on. - Others AirDrop to their friends who are still having problems. 1. The Art teacher decides to go and seek the help of another teacher who is more knowledgeable about technical issues. - The teacher arrives and suggests that those who were able to download the content should log off from the Wi-Fi, which would make things faster for the others. - She then suggests other ways in which the girls could enrol in the iTunes U course. 2. Most of the girls are now able to enrol but there are a few who were unable to.

This first interaction immediately highlighted the importance of the Apple platform with the use of the iPad and the iTunes U course. It also confirmed statements made by the principal about the adoption of the Apple platform for teaching and learning, which was corroborated by Cathy during our interview as she stated, "*so we use technology quite a lot in the classroom*". She added that "*the girls make use of iPads, we use our MacBook, we use the projector quite a lot*". During observations of the lessons, iPads were used in nine out of 10 lessons. It was not used in the lesson that was held in the gymnasium where the learners were planning a 'flash mob'.

This first lesson also showed learners' and teachers' knowledge of the technological affordances and capabilities of the technologies used as well as the affordances of immediacy and accessibility

as learners were told to AirDrop course content to their friends who were having problems downloading the lesson resource. The slow Wi-Fi interrupted the lesson, prompting the teachers to seek technical support from another teacher who had more technological knowledge. That teacher diagnosed the problem and offered additional advice to the class. This also confirmed the principal's comment that some teachers are "champions of technology".

The integrated use of the iPad and the iTunes U course demonstrated the generative use of technologies by the teachers who prepared and curated their lessons using multiple sources before uploading them onto the application for learners to access. This collaborative sharing of materials is afforded by the learning platform and access to Wi-Fi. The connectivity problems that can occur when a large number of learners are connected to Wi-Fi at the same time was apparent in the first interaction. During our interview Cathy stated,

Sometimes we have a problem with the internet where it's down ... So, internet is an issue sometimes. I think depending on, I know like in the Hall the internet is a bit slow, so I think it's exactly where you're located and how many people are linked to the internet but I think that's something everyone faces everywhere with slow connectivity.

Given the problem encountered in the first lesson with the Wi-Fi connections, she distributed handouts to those learners who were unable to download the course materials during the second lesson. Using the monitoring feature on the iTunes U app, she was able to see which learners had not yet downloaded the material. This allowed her to plan accordingly to ensure that no learner was compromised during the lesson. During Lesson 3, she mentioned this to the large group and also projected the notes onto the screen to ensure that everyone had access to the content.

In this History classroom, the digital technologies the teacher mainly used was to access downloaded course content from the iTunes U app and to project lesson notes onto the white board. The affordances of accessibility and immediacy allowed the learners and the teacher to access classroom resources anytime and anywhere.

Learners generally used their tablets to access the course notes. They also used the internet to conduct research. In one of their lessons, they were asked to define the word 'inequality'. In their groups they searched online for the term before providing feedback to the class. The accessibility

of the internet afforded access to multiple sources of information and allowed them to explore the definition of the word as well as extend the learning to issues of equity.

During Lesson 4, which took place in the History classroom, learners again accessed the course on the iPads and the teacher read the notes from her iPad. Some learners also used their iPads to make notes, including drawing diagrams. However, most wrote on examination pads. Although the affordances of the various technologies allow for the submission of tasks via the learning platform or by email, learners were required to submit hard copies of their work. Table 5.3 gives examples of learners' technology use

Table 5.3: Lessons 4, 5 & 8

Lesson 4: The French social structure <i>Teacher 1; learners 2</i> 1. The teacher starts by asking the learners to take out their 'defining a revolution' task, written on loose sheets of paper. She goes around the room and collects their work. <i>Later in the lesson:</i> 1. "I will be drawing a big triangle on the board. We're going to make a mind map. You're welcome to take a photo at the end of the lesson ..." - The teacher draws a triangle on the white board. 2. Most learners take out their exam pads and draw and label the diagram. 2 of them make notes on their iPads and draw the triangle using a drawing app. Lesson 5: 1. The teacher briefly recaps information about the 1st and 2nd estates by referring to the diagram on the white board. She speaks about inequality and what it means, then says let's look at our notes. 2. Two learners make notes on their iPads; the others write on exam pads. 1. She reads her notes on her iPad while the learners follow. Lesson 8: <i>(Most of the girls make notes on their iPads. A few write on their exam pads)</i> 1. The teacher recaps the work covered so far. She checks that the girls have all got their notes and asks if they're following her.

It is evident that even though learners could have used their iPads to access course content and take notes, they generally opted to use pen and paper to make notes. However, in Lesson 8, most of the girls made notes on their iPads. This demonstrates the principal's statement in our interview that learners had to option to use technology if they wanted.

In Cathy's class, the Wi-Fi was rarely used because the course content was downloaded at the beginning of the term. Learners were prohibited from using smartphones in the class even when

they forgot their iPads at home. During Lesson 5, one of the learners did not have her tablet and asked for permission to use her smartphone; the teacher suggested that she should rather share with another learner.

When assessing the use of digital technologies in Cathy's History classroom, I found evidence of representative and generative use of technology although the representative use of media dominated as technology was mainly used to transmit content. The teacher used the iPad and her MacBook to deliver instruction (Hokanson & Hooper, 2000). In this instance, digital technologies were mainly used to access lesson files and notes from the iTunes U app. Note taking on the iPad by some learners could be regarded as representative use of media; if they had included hyperlinks or other images to the notes, they would have been using media generatively. However, the nature of classroom observations did not allow for any direct learner engagement to ascertain how they were using technology. Learners' brief internet research to define 'equality' was another example of its representative use. However, the information garnered on the internet generated a much deeper discussion among learners in the group about equity and equality. Hokanson and Hooper (2000) stated that when media are used to generate thoughts and ideas, its use can be considered generative.

The curation of multimodal content for the Revolutions module that was placed on iTunes U can be seen as the generative use of media by the teacher. However, learners used the app in its representative form mainly to access curated notes and not in a generative sense to maximise its affordances. An opportunity for the transformative use of digital technologies by learners occurred in the final lesson when learners were tasked with creating a combined multimodal presentation as their final project. The task allowed learners to harness multiple digital affordances such as accessibility, active knowledge making, multimodality and nonlinearity and diversity in a transformative way. The instructions are shown in Table 5.4.

Table 5.4: Lesson 10: Revolution final assessment

Lesson 10: Revolution final assessment

1. "For the final assessment of the Revolutions module, you will be divided into groups and given a historical visual source focusing on an important event from the French Revolution."
 - "You and your group will be expected to re-enact your visual source. Please keep the following in mind:

1. Historical accuracy and analysis of visual source.
2. Art: Creating a propaganda poster.
3. Making use of music in your [presentation] that is relevant and applicable.
4. Using the staging convention skills you learnt this term in Drama to bring your historical visual source to life."

Unfortunately the final product was not observed as the period of observation at Queenstown College had ended.

In summary, most of the activities in the History classroom required the representative use of digital technologies, and the generative use of digital technologies was rare. This represents opportunities for learning *from* technology with fewer opportunities for learning *with* technologies. Cathy largely harnessed the affordances of accessibility, ubiquity and nonlinearity, but except for its technical monitoring capabilities, she did not harness the collaborative and interactive affordances of the Apple platform.

The next section examines the English teacher's use of digital technologies in the classroom.

5.2.2.2 Appropriation of digital technologies in the English classroom

Liselle's English classroom was equipped with a data projector suspended from the ceiling, two speakers mounted on the front wall and a large white board. She used a MacBook and an iPad in her lessons; although her MacBook was used more frequently. Regarding the use of digital technologies, Liselle asserted that *"for the most part, I find it very effective"*, but she said this depends on how well prepared she was. She added that *"if they [learners] have the option to use the technology, then there is more 'buy-in' in terms of that lesson"*. Her Grade 9 English classroom was further evidence of Queenstown College's iPad policy and the use of the Apple platform. Liselle mainly used the data projector to project downloaded content from her laptop onto the white board. In my interview with her, she stated that *"the Apple Classroom is really great"*. She said that she particularly loved its monitoring feature: *"So while they're in my classroom, I can see how many minutes they have spent on each app, what they've been doing, and I can make sure that they're not doing things that they're not supposed to be doing"*.

During Lesson 6 of classroom observations, she advised the girls that she had set up an Apple Classroom on her iPad. Table 5.5 contains the extract from that interaction.

Table 5.5: Lesson 6

Lesson 6 <i>Teacher 1; learners 2</i> 1. "Please go to your settings. Make sure you're connected to Wi-Fi. Find Grade 9 English." - She then gives them an access code <i>Some devices have not been updated so these learners are having problems logging into Classroom which they eventually do.</i> 2. One learner asks, "So you see what we do when we're on?" 1. "When you walk into my classroom, these will go on. When you leave, they go off." <i>She then adds the learners individually to the Apple Classroom</i> 1. The teacher then says, "Here's the deal. Respect is given. I will never ask to look at your screen. I will check which apps you're on. You don't turn it off, I do."

One way in which Liselle used the data projector and her MacBook was to project multimodal texts onto the white board. A downloaded rap video about the elements of a short story was played during the second lesson. This was a brief impromptu activity as the class was revising the elements of a story. One learner spontaneously stood up and started to sing while other learners joined in the singing. The teacher seamlessly switched to the video and the lyrics were projected onto the white board.

In a combined lesson with another Grade 9 class, learners wrote a listening comprehension test. The lesson was held in the conference room as a bigger space was needed for the two groups. Digital technology in the form of speakers and a MacBook were used to play the audio file for the test. The teacher had downloaded the podcast prior to the lesson and a member of the IT support team had set it up.

Learners generally accessed lesson notes on their iPads as well as texts in the form of pdfs that were emailed from time to time by the teacher. Pdf copies were emailed as learners indicated that it was difficult to download the iBooks. In our interview, Liselle expressed her preference for pdfs, especially for books, by stating,

I think in terms of accessibility, making sure that the files aren't too big because sometimes if you're giving the girls a 300 MB iBook to download, when it comes to it, it's just too big for 20 girls to download in one lesson. So, I think in terms of accessibility, that's important. That's why I prefer a pdf to an iBook because it's just a reduced format.

In Liselle's Grade 9 class, some form of digital technology was used in every lesson, even on the first day when learners were delivering their prepared speeches based on the title of a novel. Before commencing their speeches, they were required to show the teacher the novel, and some learners showed the digital copy of their chosen book, which was 'new media' replacing a traditionally activity. Learners' use of their iPad and the Wi-Fi was observed when they were asked on a rare occasion to google the meaning of a word during their study of the short story *A Trip to Gifberge*. The class was asked to complete the reading of the short story for homework and to google the meaning of unfamiliar words. Apart from the pedagogical use of their devices, learners were allowed to listen to music once on their iPads while they worked.

The teacher's MacBook and the data projector were used most frequently, and the speakers, Wi-Fi, and learners' iPads were used occasionally. There were only two lessons in which all learners used their iPads. This was during Lesson 6 when they were asked to connect to the Wi-Fi as the teacher was setting up the Apple Classroom, and during Lesson 9 when they were studying the South African short story *A Trip to Gifberge* when learners accessed the story from their tablets.

The representative use of digital technologies was dominant in Liselle's classroom with learners mainly learning from digital technologies that were used to transmit information. This was seen in the projection of course notes onto the white board, the sharing of pdfs of short stories to learners via email and googling the meaning of words. The focus was therefore on learning *from* technology as opposed to learning *with* technology. However, the curation of course notes onto the iTunes U app as well the creation of the Apple Classroom can be seen as the generative use of the learning platform. Yet, except for the multimodality of the podcast and the short story rap, the versatility of learning and other action possibilities of the available digital technologies were not harnessed in Liselle's English classroom.

In summary, despite the ubiquity of digital technologies for teaching and learning at Queenstown College, both Cathy and Liselle used them mainly for representative purposes, focusing on learning *from* technologies. Examples of their generative use were the creation of teaching resources that were placed on the Apple platform. In the History classroom, the multimodal task during the final lesson observed allowed learners to create content using technology. Consequently, the harnessing of the various affordances of technologies was not observed.

The next section examines teachers' pedagogical strategies.

5.2.3 Teachers' Pedagogical Practices at Queenstown College

5.2.3.1 *Patterns of interaction in the History classroom*

The chairs and tables in the room used for the History class seemed to have been arranged to encourage collaboration among learners. Except for the gymnasium, there were large circular tables with chairs in the other rooms that each accommodate 6–10 learners. When presenting her lessons, Cathy generally walked around the room to engage with learners and ensure they were not off-task.

Since learners were being introduced to new content during their first History lessons, there was a high level of teacher-student interaction. The interactions involved the teacher presenting new information and content about the topic Revolutions in some instances going through definitions of new words, guiding the discussion, summarising what was taught, and checking learners' understanding of the content. Table 5.6 is an extract from Lesson 2.

Table 5.6: Lesson 2: Revolutions

Lesson 2: Revolutions

Teacher 1; learners 2

The teacher uses her iPad. She distributes a handout which she has prepared titled 'Defining a Revolution'. These are printed since not all of the children have been able to log on their iTunes U course. Some learners use their iPads and a few use the handouts.

1. The teacher starts by asking the learners to define a revolution.
2. A few learners respond
1. The teacher speaks about different kinds of revolutions: sexual, and refers to the advent of contraceptives as one kind social revolution. She states that not all revolutions are political; they can be social and cultural. She mentions technological revolutions. She explains that a revolution is when a fundamental change takes place. She then asks for volunteers to read.
2. Learner reads one section from her iPad.
1. The teacher explains the section and gives more details.
1. She asks what is meant by 'The myth of speed', the title of the first section. (There's no answer) She then refers to the industrial revolution which was a process. Hence, the 'myth'.
2. Another learner reads the next section
1. The teacher summarises and explains.

This pattern continues until the readings are complete.

Cathy first asked the learners to define the term 'revolution'. After a few learners had responded, she elaborated. As learners took turns reading, she provided further explanations and then summarised the discussions. A similar pattern of interaction occurred during lessons with the smaller group. The teacher started by recapping what was learnt in Lesson 3 during the combined lesson. She then read from her iPad, pausing to explain or ask questions as well as to check understanding by asking, *"Do you all understand that?"* and *"Any questions before we move on?"* Cathy also drew a diagram on the white board to provide a visual representation of the social structure, which most learners copied in their examination pads and two drew on the iPads. The same pattern of engagement between the teacher and learners continued in the fifth lesson: She reminded learners about what was covered previously while learners made notes, and then she read from her iPad with learners interjecting to seek clarification and ask questions. Teacher-student interaction was coupled with student-content interaction as learners made notes during the lesson. This mainly involved the use of pen and paper but on a few occasions this student-content interaction involved the use of their iPads.

Another way in which the teacher encouraged participation and learner engagement during periods of high teacher-student interaction was to pose frequent questions. This was observed during Lesson 8 (Table 5.7).

Table 5.7: Lesson 8: Estates general

Lesson 8: Estates general <i>Teacher 1; learners 2</i> <i>Most of the girls make notes on their iPads. A few write on their exam pads.</i> 1. The teacher recaps the work covered so far. She checks that the girls have all got their notes and asks if they're following her. - She reads the notes from her iPad and gives background into Louis XVI. She states that whenever the King needed money, he increased taxes then asks, <i>"Girls, is that fair?"</i> 2. <i>"No."</i> 1. The teacher reads again and pauses to explain, referring back to the information from previous lessons. - She asks, <i>"How are you going to feel if you have to pay taxes?"</i> 1. Angry, worried, betrayed were the answers given 1. The teacher reads about the Estates General. She illustrates on the white board. 1. She explains in detail about representation within the Estates General. She explains that the bourgeoisie were the middle class within the 3rd Estate; then asks, <i>"Why did the bourgeoisie represent the 3rd Estate?"</i>

- | |
|---|
| <ol style="list-style-type: none">2. One learner explains that they had the same level of education as the 1st and 2nd estates.- Another explains that the uneducated couldn't really voice their opinion. |
|---|

High teacher-student interaction continued during the second part of the same lesson, which dealt with source analysis and understanding political cartoons. Learners were required to log out of their iTunes App and access a Microsoft Word document that had been emailed to them. Since learners were not familiar with the cartoons and the information presented was quite new to them, there was high teacher input as she dominated the discussion. There were a few questions for clarification from learners.

Learners were generally very engaged when they were asked to work in groups. This was first obvious during Lesson 3, which was an integrated lesson with the entire grade. This was the first group lesson to discuss the topic revolutions. The History teacher led the lesson with the Art and Drama teaching assisting. The girls sat in groups and were first given two minutes to come up with a definition of 'inequality'. They immediately began to search the internet for definitions and their discussions became animated as they discussed the information they found online. Though the learners were very engaged in the discussions, this is an example of low student-student interaction using digital technology as it lasted for only approximately five minutes. It was followed by a brief period of teacher-student-content interaction as learners enthusiastically provided their various definitions of inequality. One group stated that they started debating the terms equity and equality, suggesting that they explored deeper meanings of the various terms. Medium teacher-student interaction ensued as the teacher returned to the notes and started to read from her iPad. Table 5.8 is an extract from part of the lessons that shows teacher-student and teacher-student-content interaction with input from the Art teacher.

Table 5.8: Lesson 3: Combined Grade 8 lesson on revolutions

Lesson 3: Combined Grade 8 lesson on revolutions

<i>Teacher 1; learners 2</i>

- | |
|---|
| <ol style="list-style-type: none">1. "Girls let's look at the notes on iTunes U." |
|---|

<i>Teacher reads from her iPad. The notes are projected onto the screen for those who still can't access.</i>

- | |
|---|
| <ol style="list-style-type: none">1. "Girls, you mentioned some of this in your groups. Issues like gender, education. For example, in South Africa there is inequality where some schools don't have textbooks."- The teacher continues to read, then mentions that in South Africa during apartheid, not everyone had the right to vote. |
|---|

- "Any questions so far?"

(After a few minutes)

1. The teacher reads about the French Revolution.
- Asks, "Is everyone ok?"
2. A learner asks a question about women who didn't have the right to vote.
1. The teacher mentions the suffragette movement and states that women didn't have the right to vote until the International Declaration of Human Rights.

There is a little text box in the document with unfamiliar words. The teacher goes through the words in relation to the French Revolution.

2. A learner asks, "Did the people not have a choice to educate themselves?"
1. The teacher explains that they didn't have the opportunity.
- The Art teacher also offers an explanation.
2. "So, I just wanted to check, the wealthier weren't paying taxes and the poor people were?"
1. The History teacher mentions that they are going a bit off topic and state that they would look at this in the next lesson but told the learner she was right.
- She asks, "Did I answer your question?"
- The teacher continues to read from the notes then explains, "Girls, you will see that the people were unhappy. They didn't have basic rights. They grouped together."
2. "Is it only a revolution if the underprivileged people succeed?"
1. "It is basically when a complete change happens. The French Revolution took a long time."
- "A huge change has to take place. There was a move from having a king or a monarch to a set of political parties or from a dictatorship to a democracy."
2. "So if people revolt and things become way worse, is that a revolution?"
1. "It's a failed revolution. Have you heard about a coup d'état?"

Discussion ensues between two teachers about the correct pronunciation of the phrase.

1. "There are times when there is a coup but it fails."
2. "If there is little change, could it be seen as a revolt or an uprising?"

There is a discussion about a coup and a revolution and the move from a democracy and a dictatorship for about 5 minutes with learners asking more questions.

The interaction in Table 5.8 involved the teacher reading from her notes and pausing to explain the content and affirm learners' understanding of the subject matter. In this excerpt, the teacher-student-content interaction was initiated by learners who posed critical questions like *"Is it only a revolution if the underprivileged people succeed?"* or *"If people revolt and things become way worse, is that a revolution?"*, as they tried to improve their understanding of the topic. Medium teacher-student-content interaction occurred during Lesson 6 as the teacher and learners worked together to make sense of local political cartoons. This was an introduction to political cartoon analysis. However, since some of the learners were not familiar with the context of the cartoon, the teacher did most of the explaining and learners' responses were quite brief. Here's an extract from the lesson:

Learners then worked in groups for 10 minutes in a brief period of student-student interaction to analyse cartoons based on the French Revolution. They were very engaged in the activity. The teacher encouraged them to enlarge the images in their iTunes app, look for symbols and do the analysis. Learners immediately began to work in groups referring to their notes.

This lesson was also an example of multiple modes of interaction being used. The lesson started with the teacher outlining the task before jointly analysing the cartoons with learners who then worked in groups to analyse and interpret cartoons.

Lessons 7 and 10 were examples of high student-student interaction. For Lesson 7 the entire grade gathered in the gymnasium to plan a 'flash mob'. This was a combined activity. Learners were divided into three groups and were asked to think about an aspect of school life over which they could revolt and organise a little revolution to be staged the following week. They were required to apply the skills they had learnt in their music and Drama lessons to enact the revolt. Learners were very engaged as they organised the various roles.

Lesson 10 was the final day of observations when learners were given their final assessment before half-term. The teachers distributed booklets with the task and explained what was expected of learners who were placed into 12 groups. This assignment required learners to use different visual sources (political cartoons taken from <https://alphahistory.com>) and to re-enact what was depicted in the cartoon using the knowledge gained in their Art, Drama, History and Music lessons. Using their iPads and notebooks, the learners began to discuss the task as they accessed the links in the booklets for clearer images of the cartoons, assigned roles to members of the group and made notes. This lesson started with low teacher-student interaction as the teachers took turns explaining the task and was followed by high student-student interaction.

In summary, Cathy's used the four modes of interaction in her History classes, although teacher-student interaction dominated. There was also evidence of student-student interactions, and two of these were at a high level while the other two were at a low level, but on every occasion learners were highly engaged in the activity. Those at a low level either followed a period of high teacher-student interaction or medium teacher-student and medium teacher-student-content

interaction. Nevertheless, there were fewer opportunities for teacher-student-content interaction as well as student-content interactions. The interactions around technology were seamless as digital technologies were treated like another mediating tool in the classroom, such as pen and paper, which learners used mainly to access the curated and uploaded lesson notes. Nevertheless, the many interactive and collaborative action possibilities of the iPad and the Apple platform were not harnessed.

The next section looks at how the learning by design pedagogy was enacted in the History classroom.

5.2.3.2 Learning by design in the History classroom

Cathy's History lessons revealed a blend of the four knowledge processes, although the process of conceptualising by naming was dominant. Since the subject Revolutions was quite new to the learners who were having their first experience of History at the secondary level, there was a dominance of conceptualising through high teacher input. Cathy spent a lot of time presenting facts about the French Revolution, and in particular, the events that gave rise to the revolution. Information about the First, Second and Third Estates, the different types of taxes and the First, Radical and Second Stage was also presented. In addition, there was also evidence of overt instruction, a component of the earlier multiliteracies framework

The first example of overt instruction was observed during the second lesson when the teacher introduced learners to different types of revolutions. She actively led the discussions by first reading portions of the text, asking for volunteers to read, pausing to provide explanations and then confirming understanding. During one of the readings, the term *The Myth of Speed* was read. She explained what the term meant and at the end of the reading provided a summary of the section before giving learners their first task, which required them to use three pedagogical strategies. Questions 1 and 3 required learners to use the conceptualising by naming strategy where they were asked to name seven revolutions mentioned in the article and identify five words that they were unfamiliar with and then define those words. Question 3 required critical analysis by justifying one's answer with evidence from the text, and Question 5 required learners

to apply the information from the article appropriately to provide their own definition of the term ‘revolution’.

The third lesson (to which I refer in section 5.2.3.1) was also an example of the application of multiple pedagogical processes. Firstly, learners were asked to define the term ‘inequality’, which initially seemed like a task that required conceptualising by naming. However, learners also used the knowledge process of analysing critically to delve deeper into the meaning of the word by looking at power relations and having a debate about equity and equality. The teacher continued with conceptualising by naming as she presented more information on revolutions. To further explain the concept, she drew on examples from learners’ prior knowledge about apartheid and democracy as well as their knowledge about the election of student counsel representatives at Queenstown College to scaffold the learning and teach about democracy. This use of examples from learners’ prior knowledge is an example of experiencing the known. Learners posed critical questions during the lesson such as *“If there is little change, could it be seen as a revolt or an uprising?”* or *“What’s the difference between a coup or a revolution?”*

Lesson 4 was an example of the application of overt instruction and the knowledge process of conceptualising. The lesson began with the teacher summarising the previous day’s lesson content after which she read from the curated notes in her iPad, frequently pausing to provide explanations and check understanding. This sequence was occasionally interrupted by learner questions. The lesson continued with the teacher drawing and labelling a diagram representing the French social structure during the time of the revolution. Table 5.9 is an extract from the interaction.

Table 5.9: Lesson 4: French social structure

Lesson 4: French social structure

Teacher 1; learners 2

1. The teacher goes to the board and continues to label the triangle she had drawn previously.
 - She continues to talk about the social structure while adding information to the triangle. Learners write in the note pads while two do so on their iPads.
 - The teacher reads again and explains class divisions within the social structure. This carries on for about 2 minutes.
2. A learner asks, “Could people move up and down the social structure?”
 - Another one asks, “Were there actually rules?”

1. The teacher explains that it was a very strict system.
2. One learner comments, "It's kind of like apartheid".
1. The teacher states that the separation was not based on race or colour.

This interaction last for 4 minutes.

1. The teacher reads then explains for about while learners follow and make notes.
2. A learner asks a question and this results in a discussion for about 6 mins. about the various estates
1. The teacher asks, "Does that answer your question?"
2. Learner replies, "Yes, thank you".

In the extract in Table 5.9, the teacher's presentation sequence is interspersed with learner questions, and one of these leads to richer discussions around the topic. One learner tries to liken the issue being discussed to the system of apartheid, but the teacher corrects her misconception by explaining more. The above interaction is evidence of learner involvement in the process of conceptualisation. The drawing of the diagram to illustrate the social structure represents the process of conceptualising with theory.

A similar pattern of engagement continued in the first half of the fifth lesson as the class continued the discussion of the social structure and the different estates by referring to the diagram that was drawn during the previous lesson and the course notes. This period of overt instruction was again interspersed with active learner participation through questions and comments. Table 5.10 is a brief extract from the discussion.

Table 5.10: Lesson 5: Social structure

Lesson 5: Social structure

Teacher 1; learners 2

1. The teacher explains that they will be finishing off the 3rd Estate then do source analysis and analyse a political cartoon.
- She briefly recaps information about the 1st and 2nd estates by referring to the diagram on the white board. She speaks about inequality and what it means; then says let's look at our notes.
2. Learners make notes on their iPads; the others write on exam pads
1. The teacher reads her notes on her iPad referring to the previous lesson.
2. A learner interjects seeking clarification.
1. The teacher reads again. She stops to explain all the while referring to the previous notes.
2. Another learner seeks clarification.
1. The teacher reads again and follows the same pattern.
2. Another learner interjects, asking if women were allowed to fight in wars.
1. The teacher explains that they were not even though they did other jobs.
- She refers to the various taxes and tells the girls they need to learn them.

- She then goes through the different taxes explaining each one.
- 2. A learner asks if everyone in the 3rd Estate had to pay taxes to the church.
- 1. The teacher explains that during that time in France, everyone followed one denomination.
- 2. A learner comments that there was no other diversity.

The extract in Table 5.10 illustrates learner engagement, and the last learner comment is more evidence of learners relating their discussions to their lived experience and context.

Cathy also moved between other pedagogical approaches during the lessons discussing political cartoons during the sixth lesson. While the process of conceptualising dominated the fifth lesson to explain what political cartoons were, the cartoons chosen were from popular South African satirists. She also included references to caricatures of President Obama and President Trump and discussed puns and symbols. This was an example of experiencing the known. However, what the teacher perceived as familiar to learners was not as they did not quite understand all the references, particularly those to former President Zuma who were in office when they were in primary school.

When discussing voting rights in France, the teacher recruited learners' prior knowledge about the South African context to facilitate the process of conceptualising. Her strategy was posing several questions to scaffold the learning. Table 5.11 is an extract from the ninth lesson comparing voting rights in South Africa to those in France.

Table 5.11: Lesson 9: Voting rights

Lesson 9: Voting rights

Teacher 1; learners 2

1. She [the teacher] asks questions and explains that certain people weren't allowed to vote, like poor workers, women. Everything that they had fought for was useless as the majority of the population was still not allowed to vote.
- She then asks how is this different from SA voting rights today?
2. "In SA women are allowed to vote and anyone over the age of 18."
1. "Lovely. So, in SA you have to be a SA citizen, 18 yrs. and older, male or female from any racial group."
- "How is this different from France's voting rights?"
2. "In France women weren't allowed to vote. And you had to be 25 yrs. and over."
1. "That's right. So how is it different from France's voting rights today?"
2. "Anyone over the age of 18 can vote."
1. The teacher then asks if all women in SA got the right to vote and in which year?

(Incorrect answer given).

1. "Remember, all women, all races. When did South Africa become a democracy?"

2. "1994"

(Further discussion about voting rights in South Africa)

There were opportunities for learners to apply creatively during Lessons 7 and 10. In the seventh lesson, learners used their knowledge about revolutions and their drama and music skills from the combined module to plan a revolt. During observation of the planning lesson, learners used the gestural/performance and oral/speech modes to plan the revolution. So, this was a multimodal lesson without the use of digital technologies.

In the tenth lesson (mentioned in section 5.2.2.1), learners collaborated on their final assessment, which required them to appropriately and creatively apply the knowledge gained during the term. They were tasked with creating a production using assigned political cartoons and applying the knowledge and skills learnt during the Music, History, and Drama lessons. Their artistic response had to be a propaganda poster. The task therefore required learners to combine a mix of modes to provide a multimodal response that required them to apply their understandings of the concept of revolutions to create a new task that included the visual, audiovisual, gestural and oral modes.

In conclusion, Cathy's pedagogical approach was characterised by a blend of modes of interaction and knowledge processes along with evidence of overt instruction. High teacher-student interaction is linked to the process of conceptualising and overt instruction. Learners' actively participated in discussions by posing questions and making comments, which was encouraged by the teacher. Her strategy of questioning and scaffolding as well as her engaging their prior knowledge and experiences made it possible for learners to engage in the discussions. Hence, periods of conceptualising were at times accompanied by the knowledge process of experiencing the known. There were fewer occasions of teacher-student-content interaction, which is linked to fewer opportunities for analysing. Opportunities for learners to apply their knowledge appropriately and creatively were generally linked to high student-student interaction, and in the case of the cartoon analysis, to low student-student interaction. The examples of experiencing the known that were evidenced in Cathy's lessons signal an attempt by the teacher to engage with learners' lived experiences to facilitate meaning-making.

The next section examines the English teacher's pedagogical practices.

5.2.3.3 Patterns of interaction in the English classroom

The English classroom was a relaxed and lively space with the teacher adopting a very conversational style with learners. The chairs were arranged in rows facing the white board and learners sat in individual seats facing the front. The teacher's desk was located to the right of learners, and she would generally stand close to her desk.

Liselle's questioning style was evident throughout her lessons as there was constant negotiation of meaning involving learners. Her rationale was that it is important for learners *"to engage so that the knowledge and the content, instead of being grounded in me as the main source of information, actually comes from their own intrinsic motivation"*. This, she stated, guarantees more 'buy-in' from learners.

Consequently, her English lessons generally involved a blend of modes of interaction. During the lesson on the second day of observations there was high teacher-student and low student-content interaction as the class began to explore the structure of a short story. The lesson started with the teacher reading an incorrect definition of a short story from the notes projected onto the white board and then asking, "Do you agree with that stuff?" Learners indicated their disagreement, and one of them spontaneously started singing a rap about the elements of a short story they had learnt previously. Because of the immediacy afforded by technology, the teacher was able to switch seamlessly to the video of the rap that was downloaded onto her MacBook for a brief period of student-content interaction. This allowed for a multimodal engagement as the learner who had started the song, and a few others got up and began to dance. Table 5.12 is an excerpt of that student-content interaction.

Table 5.12: Lesson 2: Lesson on short stories

Lesson 2: Lesson on short stories

Teacher 1; learners 2

Notes about short stories projected onto the white board from teacher's MacBook.

1. The teacher reads from the notes projected on the white board: "A short story is a literary composition with one plot, one dominant character and setting"; then asks, "Do you agree with that stuff?"
2. Learners disagree.
 - One says the definition includes much more than that.

- Another learner spontaneously starts to sing a rap about the five elements of a short story that was taught to them in a previous lesson.
- 1. The teacher switches to a downloaded video with the rap about the elements of a short story and plays a short clip.

The video with lyrics is projected onto the whiteboard and the sound comes through the speakers, which are mounted on the walls.

- 2. A number of girls join in and start to sing along and seem to be having fun.
- The learner who started the song is on her feet dancing.

After a few minutes the singing stops, and the teacher switches screens, and returns to the notes about short stories.

Teacher-student interaction continued with the teacher returning to the notes and asking learners, “*What is setting?*” She referred to the setting of a previous short story that was studied. Then, by posing a series of questions in which she used examples from the local context, she was able to guide learners towards an understanding of what a setting of a short story was without explicitly telling them.

The teacher’s strategy of using frequent questioning to engage learners and encourage more buy-in to the lessons continued during Lessons 4 and 5 as the class further explored the different aspects of a short story. In Lesson 4, Liselle began by asking learners “*to remind*” her of what a setting was. This started a long period of high teacher-student interaction with learners responding by providing suggestions. The class discussed characterisation using references from popular culture and examples from everyday life. The discussion then shifted to conflict, climax and style, and during the discussion about conflict the teacher asked, “*Can someone give me an example of an external conflict?*”, to which one learner replied, “*Little Red Riding Hood*”. In this brief discussion about internal and external conflict, low teacher-student-content interaction was observed as the class critiqued the story, suggesting different variations of the story.

In Lesson 5 there was a blend of modes that began with medium teacher-student interaction and continued with student-student and student-content interaction, ending with teacher-student-content interaction. They concluded the discussion on the various aspects of a short story, and learners were given a task to apply their newly acquired knowledge to answering questions based on a short story they had studied. Although this activity was framed as a group activity, Liselle allowed learners to determine the composition of their groups or if they wanted to work alone as well as where they wanted to sit. She told them to “*get into groups of four if you want or if*

you want to get into a group of three that's fine". In the end there was one large group of four learners, one pair and the others worked individually; hence, student-student interaction with those who worked in groups and student-content interaction for to those who worked individually. The larger group opted to sit on the floor and the others remained at their desks.

Multiple modes of interaction were again evident in the sixth lesson. There was high teacher-student-content interaction as the teacher and learners discussed the questions done during the previous lesson. This continued as they deconstructed a 34-word short story called *The Scarlatti Tilt*. Liselle first asked learners if this could be considered a short story and one of them agreed saying that it had a plot. She then asked them, "*What is our short story rap?*", which caused a few of them to start singing. They then began to unpack the various aspects of the story using the rap as a guide. Teacher-student-content interaction was followed by student-student and student-content interaction at a low level as learners worked in groups and individually to discuss adaptations of the original story. After about 17 minutes, they worked again with the teacher to deconstruct the adaptations. Student-content interaction generally occurred alongside student-student interaction, which also occurred during Lesson 7 as learners worked on another task.

High student-content occurred twice. The first occasion was as learners presented prepared speeches based on book titles. There were a variety of topics ranging from toxic masculinity inspired by the book *Toxic*; mental illness as displayed by characters in one of the Winnie the Pooh books; and a letter from planet earth giving 13 reasons why she was dead, based on the book *13 Reasons Why*. After the presentations, there was a brief period of teacher-student interaction as the teacher gave feedback on the speeches presented. The second occasion for high student-content interaction occurred on the third day when the combined Grade 9 group did a listening comprehension assessment. The teacher read the questions while learners wrote their answers on sheets of paper.

Lessons 9 and 10 were examples of high teacher-student interaction and low teacher-student interaction. In the ninth lesson, the class explored a South African short story *A Trip to Gifberge* that is set in the 1980s during apartheid. However, since the context was not very familiar to the learners, there was heavy teacher input as she explained some of the social issues faced by

Coloureds during that time and explained the difference in meaning between the term in South Africa and how it is used in the US. Table 5.13 is an extract from the lesson.

Table 5.13: Lesson 9: A trip to Gifberge

Lesson 9: A Trip to Gifberge

Teacher 1; learners 2

1. The teacher describes the context of the story. She first speaks about conscription in South Africa.
 - "When you finished your high school career, you were conscripted into the army if you were a white man. Except if you were enrolled at university, you were able to avoid conscription for as long as you were studying, up to a point. This was about the 80s, somewhere there. But you also had a lot of white people in particular ... themselves into exile in a way. They would move over to the UK to avoid being forced into the army; then they would cast their votes from the UK or America wherever. But now for a Coloured ... what would have happened? Do you think she would have come from an affluent family?"
2. "No."
 1. "Why?"
 2. "What does affluent mean?"
 - "Rich."
 1. "Did she come from an affluent family?"
 2. "No."
 1. "What indication do we have of that?"
 2. "There isn't really one. You would assume."
 - "The way they talk."
 1. The teacher repeats, "The way they talk. Exactly. Dialect."
 - "Effectively your dialect and the way you pronounce things can give us an indication of where you're from and who you are ... So, what we are seeing here, she was able to by scholarship or by some manner of speaking, which we don't know, she was able to go and study in the UK. She was able to remove herself from her roots ... We don't know why but she was able to study in the UK. And then she has to come back. Why? Because her father dies."
 2. "Was her father a white man?"
 1. "We don't know. All we know is that she is Coloured and she comes from a family of Coloured people."
 2. "Are they all Coloured? I thought her mom had one parent who was Black and one white."
 1. "Well, that's something you would have to justify. You'll have to find it in the story."
 2. "We've 'coined' the classic Coloured Afrikaans but if you go to America a coloured person would [be] any person of colour."
 1. So exactly. We're studying *Hidden Figures* right now with Grade 10s, and instead of referring to Black women like ... they refer to them as coloureds. You will refer to them as Black people. So, it's an important distinction So, in terms of South African history, the Coloured term is very different. (She speaks about the classification system used by the apartheid system to judge if a person is Coloured or not).

Lesson 10 was a joint poetry lesson with another Grade 9 class and the teacher and learners first made sense of the poem *Oranges* before doing a S-I-F-T (Symbol Imagery Figurative Language Tone and Theme) analysis of a poem. The teacher used her questioning approach to involve

learners in constructing their own understanding of how to analyse a poem using their knowledge of the elements of a short story. So, there was a combination of medium teacher-student-content interaction and medium teacher-student interaction as the class explored and analysed the poem together.

Liselle's English classroom exemplified a blend of interaction patterns as learners were afforded diverse opportunities to make meaning in the classroom. Several interactions involved the teacher and learners going through various texts and unpacking meaning and deconstructing texts resulting in many instances of high teacher-student and high teacher-student-content interactions. Learners were also provided with opportunities to work in groups or with a partner as well as engage with content individually. Hence, there were numerous opportunities for student-student and student-content interactions, some of which, though very engaging, occurred at a low level. Interaction using digital media was mainly through the use of iPads and the teacher's MacBook to access content with most of the interactions occurring around written text and not multimodally, despite the affordances of the available technologies. Learners' use of their iPads was quite seamless and according to their preference.

The next section examines the teacher's pedagogical strategies using the learning by design multiliteracies framework.

5.2.3.4 Learning by design in the English classroom

In our interview, Liselle indicated that her teaching approach is *"more about applying, analysing, evaluating and creating, rather than just imparting knowledge"* to help learners develop higher-order thinking skills. This speaks to some aspects of the learning by design knowledge processes, in particular applying and analysing. Liselle tended to weave between knowledge processes, involving learners in the conceptualising process while situating texts and content in their own experiences to facilitate conceptualisation. Learners were also provided with many opportunities for analysing critically and functionally as well as applying the knowledge learnt appropriately and creatively.

As the teacher introduced learners to the elements of a short story, the process of conceptualising, particularly with theory, was dominant. To facilitate the process of conceptualising, the teacher actively encouraged learner participation through frequent questioning. She also used examples from their lived experiences to assist with the process of conceptualising. Hence, earlier lessons generally included the two knowledge processes conceptualising and experiencing. This was first observed in Lesson 2 as Liselle appealed to learners' senses by providing examples from the local context to guide their understanding of the setting of a short story. She posed the following questions: "*How would you describe the top of Table Mountain?*", "*What do you smell?*", "*What do you hear?*", and "*What/how do you feel?*" Table 5.14 is an extract from this lesson.

Table 5.14: Lesson 2b: Grade 9 lesson on short stories

Lesson 2b: Grade 9 lesson on short stories <i>Teacher 1; Learners 2</i>	
1.	The teacher asks, "What is setting?" She then refers to the short story <i>The Suit</i> , which the learners had read prior to my observations. There is a brief discussion about its setting.
2.	A learner asks, "How short does a short story have to be for it to be considered a short story?"
1 & 2.	They briefly discuss the length of a short story.
1.	Then the teacher asks, "How would you describe the top of Table Mountain? You have to describe the setting."
-	She then asks a set of questions: "What do you smell?"; "What do you hear?"; "What do you feel?"; "Have you been to Cape Town when it's wet and windy?"; "How does it feel?"
2.	A learner says cold
1.	The teacher then asks, "How does it feel in Johannesburg as opposed to Durban?"
2.	"It's dry here."
-	Another one says, "It's humid in Durban".
1.	The teacher comments, "Do you see how we're describing the setting?"

Frequent reference to popular teen culture, in particular teen literature and television or Netflix series was another way in which the teacher connected with students' lived experiences and cultures (Janks, 2013) to engage them and increase their understanding of the topic being studied and ensure more buy-in of her lessons. In Lesson 4, there was references to Harry Potter, *The Hunger Games*, *A Fault in Our Stars*, *Thor*, and *The Lord of the Rings* to explain characterisation. To explain climax as part of the structure of a short story, she asked learners to name their favourite Netflix series. She then asked, "*Why is there a spike in action after a long period of*

seeming lack of action? A period in the story when you could get up and make a cup of tea?" Learners offered suggestions, which the teacher affirmed as *"the point before the climax"*. She then referred to the notes that were projected to discuss plot and structure. Conceptualising with theory continued as the teacher projected a diagram of a plot structure to help learners better understand plot structure. Learners were asked if the plot was *"linear, chronological or does it move around?"*. This was followed up by asking, *"If you say linear what does it mean?"* One learner responded, *"Linear is kind of straight"*, and then the teacher used an example from *Lord of the Rings* to explain linear and enable greater understanding of the concept.

In Lesson 5, the teacher used more references from popular culture to provide examples of the various elements of a short story and enhance the process of conceptualisation. Having introduced the various elements of a short story using the processes of conceptualising and experiencing, learners were given the opportunity to analyse an African short story, *The Suit*, by applying the knowledge they had learnt. The extract in Table 5.15 shows some of the discussion that took place during Lesson 6 as the class reviewed their answers.

Table 5.15: Lessons 6: Comprehension on The Suit

Lessons 6: Comprehension on *The Suit*

Teacher 1; learners 2

The teacher first reads the questions before discussing the answers.

1. "How does Philemon feel about the suit? What does the suit represent and symbolise to him?"
2. Learner says, "This one is difficult".
 - Another learner answers.
1. Teacher says, "This is very well said", and gives further explanations; then asks, "Anybody wants to add anything else?"
2. 3 learners respond. One says, "The suit actually becomes the weapon."
1. The teacher remarks that that was a great observation.
 - The teacher continues to read, "How does Tilly feel about the suit? What does it represent and symbolise to her?"
2. "This is an easier one. It's her shame."
1. "I think she regrets it."
2. "She regrets it because of Philemon's action."
 - Another learner adds to the answer.
1. "Question 4: Is the suit a 3rd character in the story. Explain your answer carefully."
2. One learner suggests that it becomes a 3rd person and explains why.
 - Another learner suggests that "It is a representation of things in the story. It is used as a projection of everything that happens."

- | |
|--|
| <ol style="list-style-type: none">1. The teacher asks, "Do you think you're both right?"2. "Yes. It's the way you interpret it."1. "Yes. It's the way you justify it. Both of you are right. When we come to the opinion part of the question, you need to back up your answer." |
|--|

The two knowledge processes used to make sense of the comprehension were analysing and applying. Question 1 and 4 allowed for functional analysis of the text as the class examined how personification and other techniques were used for effect in the story. By also using critical analysis, learners were able to unpack different levels of meaning as well as symbolism in the story. These opportunities "to view texts from different perspectives and unpack different levels of meaning" reflect principle of critical literacy (Janks, 2013).

The next activity involved the teacher and learners deconstructing and analysing *The Scarlatti Tilt*, the 34-word short story: "It's very hard to live in a studio apartment in San Jose with a man who's learning to play the violin. That's what she told the police when she handed him the empty revolver."

The questions required learners to analyse the story functionally as well as apply the knowledge about the elements of a short story appropriately to determine if this could be considered a short story. After critically engaging with the adaptations of *The Scarlatti Tilt*, learners were given the opportunity in the next lesson to appropriately and creatively apply everything they had learnt about short stories to write their own short stories. Here is one learner's adaptation of *The Scarlatti Tilt* using the context of life in Johannesburg: "It's very hard to live in a house without an alarm system. That's what she told the police when she handed them the empty revolver."

In the last two lessons, Lessons 9 and 10, the teacher again used different pedagogical strategies to make sense of the texts. In Lesson 9, the short story being explored was a South African short story *A Trip to Gifberge* set during apartheid. Learners were not familiar with the context as the story is set in the Coloured community, with which they seemed unfamiliar. Consequently, teacher input was longer than usual as she spent a lot of time explaining the context and the concept of conscription.

There was then a shift from conceptualising to critical literacy seen in the process of analysing critically as together they explored the issue of difference and 'othering', where people are

treated differently because of the way they talk or their dialect. Liselle shared her own experience about the way she was othered because of the way she spoke. To explain the difference in the concept of 'Coloured' in South Africa and the US during segregation, she referred to the movie, *Hidden Figures*, a set text for the Grade 10s. During the reading of the text, there was another example of critical literacy as Liselle explored the power dynamics between the mother and daughter in the story. There was another shift to conceptualising by naming as they explored the definition of the words 'lament' and 'palliatives'. The teacher was able to convey the meaning of lament using a Harry Potter reference.

Learners were given comprehension questions based on the text for homework that required them to use of different knowledge processes to arrive at their answers. For example, the first question required them to identify and explain the figures of speech used, which required conceptualising with theory in the identification of the various figures of speech with learners' needing to analyse the function of the figures of speech. Question 3, *"(E)xplain how the author uses the sense of smell as a reflective tool to relate to personal experience"*, and Question 10, *"What race is the narrator? Do you think it is relevant to the plot? Why?"*, required the use of critical literacy tools in learners' responses.

In the poetry lesson, Liselle employed different knowledge processes to guide learners' understanding of the poem titled *Oranges* and the analysis of poetry. The knowledge processes of analysing functionally and critically and conceptualising with theory and by naming were used. There were instances of experiencing the known as the teacher asked learners to reflect on their first date experiences to understand and identify with the young boy in the poem who was going on his first date. The subject matter of the poem, that of a young boy going on his first date, is an experience to which the learners in the class could relate. Later in the lesson, as the class continued to discuss the significance of the title *Oranges*, Liselle advised learners that they needed to draw on their background knowledge, a feature of experiencing the known, to answer a question.

The process of unpacking the various aspects of the S-I-F-T analysis involved conceptualising by theory and naming as they first discussed the formula for analysing the poem as well as the meaning of the different names, like setting, intention, feeling and tone. The exploration of the

various poetic devices required functional analysis and referring to the poetic devices, intention of the poet and so forth required functional analysis.

Liselle's strategy of deliberately situating texts and classroom discussions around students' interests and topical issues can also be seen in her choice of the podcast for their listening comprehension on the third day of classroom observations. The text was about Sarah Jayne King, who like Trevor Noah, was 'born a crime' during apartheid South Africa.

In conclusion, Liselle's English lessons exemplified the frequent use of multiple knowledge processes as well as multiple modes of interaction to make meaning. She often recruited learners' prior knowledge, connected with their lived experiences by using many examples from their local context and referred to texts and other examples from popular culture as she engaged with issues that were of interest to their lifeworlds. This demonstrated the teacher's strategy of harnessing learners' epistemological diversity to make meaning.

Some activities also required critical and functional analysis of texts with opportunities provided for learners to apply what they had learnt appropriately and to create new texts. The teacher involved learners in the conceptualisation process when they were introduced to new words and concepts. Conceptualisation therefore involved the teacher guiding the learning to help learners arrive at meanings.

The two teachers at Queenstown College used multiple modes of interaction and knowledge processes to provide rich learning experiences. The English teacher used more diverse pedagogical strategies than the History teacher, which allowed for more learner agency and freedom. However, there was less technological pedagogical integration in both the History and English classrooms as there was relatively low transformative use of digital technologies.

The next section examines the teachers' perceptions of the 21st century classroom.

5.2.4 Teachers' Perceptions of the 21st Century Classroom

In articulating her vision for the contemporary classroom, Lynne, the principal, focused on issues such as freedom, integration, 21st century skills and blended learning. She painted the following picture when emphasising learner freedom:

Girls sitting in groups, some of them sitting, some standing, some walking ... technology being used as an integral part of what they're doing, as a learning tool, as I say, not as an add-on. Those that want to use it, do; those that don't, don't. But the teachers certainly using materials that are technology related and teachers using whether it's an iBook, whether it's a video. That's how I see the whole class functioning. I also see a lot of different groups doing different activities ... So, the teacher is more kind of a guide going from group to group... integrating and seeing what they're doing.

Her statement indicates that technology would be an integral aspect of the classroom with learners having the freedom to use it or not, as was observed in the English and History classrooms. Learners would also be free to determine whether to sit or stand and whether to be in a group or not. This was particularly observed in the English classroom. Lynne's description also indicates a move away from a traditional classroom setting to one that is multimodal and where digital technologies are integral and integrated into the learning process and not as an add-on. However, classroom observations did reveal that digital technologies were being used as add-ons with opportunities for the transformative use of such technologies being reserved for special projects or isolated events.

Lynne also stressed that blended learning is vital in the 21st century classroom, but *"it's not kind of a free-for-all, but structured in terms of skills"*. She further defined 21st century skills as 'soft-skills' or 'longevity skills', such as creativity, critical thinking, and problem-solving. These were the skills that *"would take you into the workplace"*. She added that given the fact that content could be looked up so easily, regurgitation and knowing facts were completely outdated. Instead, learners needed to be taught to ask questions and to enquire, which was evidenced in classroom observations and the Philosophy for Children lesson.

In our interview, Cathy, the History teacher, highlighted James Anderson's *Habits of Mind* as vital for learning in the 21st century. These were explicitly taught in the junior school and more implicitly reinforced at the College. Cathy noted, *"The Habits of Mind that we do here ... I think that's quite important, knowing that the girls we're teaching now might do jobs that don't even exist yet"*.

When asked which of the 21st century skills she considered to be most crucial, Cathy stated it *“would definitely be critical thinking, getting girls to think very carefully and also to not be afraid to do something”*. Along with critical thinking, she added that *“striving for accuracy”* was a *Habit of Mind* that *“goes nicely hand in hand with the critical thinking”*.

Liselle, the English teacher framed 21st century skills around the *Solo Taxonomy* as follows:

So instead of actually being so content based, it's about getting the learners to 'buy-in' in the sense that they need to do their own research. They need to engage so that the knowledge and the content, instead of being grounded in me as the main source of information.

The teachers also said that collaboration is another crucial skill that is central to the growth curriculum. One area in which collaboration occurred is Project Day, which happens twice per term and focuses on a project-based approach to learning. This involves learners working on specific projects, some of which involves the use of technologies, to create knowledge. This was part of the school's strategy to develop research skills, which the principal stressed was done in all grades.

In conclusion, there was synergy between the views of the principal and teachers surrounding the contemporary classroom, which reflected what Kerr (1996) referred to as a “shared vision”. The common thread in their shared vision was a shift in focus from digital technologies to the skills learners needed beyond the classroom and these skills being taught in an integrated environment.

5.3 DUKE'S COLLEGE

5.3.1 Context

It's Friday, the final day of classroom observations at Duke's College, and I'm waiting outside the computer room to meet with Liam, the IT Director. He had been employed at the school nine months prior, as he stated, “to sort out problems with technology”. He comes running across the field, excited but clearly exhausted. He is about 15 minutes late. He apologises for the lateness and explains that he is busy preparing for their 'rip and

replace', which is the complete overhaul of the digital technologies at the school, which is due to occur the following Monday. He states,

We're taking down the entire network. We're pulling out all the network: all the cabinets; all the wireless access points; all the technology. We're actually taking it all out, putting it into boxes, and we're replacing it brand new... We're putting in 'state-of-the-art' fibre optic cabling. We're putting in state-of-the-art Dell switches. We've actually had a gentleman from Dell in the US fly over to South Africa and show us which switches that he believed would work best for us. It's an enterprise level switch. So that gives us IOT [internet of things] capabilities and all sorts of future proofing, and from an access point of view, a wireless point of view, we're putting in a Ruckus system. And that is also designed very well for classrooms, schools, universities that sort of thing ... It's a very, very clever system that we're putting in so it's going to improve all the teachers' and all the students' lives significantly.

Duke's College is a well-resourced, monastic private school in the northern suburbs of Johannesburg and has a pre-primary section, a preparatory school and a College. At the time of observations, the College had approximately 674 learners and 67 academic staff. During my period of data collection, I interviewed, Rupert, the principal, who had been at the school for just over six years; Liam, the IT Director, who had been in the position for under a year; Marie, a Grade 9 English teacher, who had been at the school for just two months; and Alice, a Grade 9 History teacher, who had taught at the school for three years.

Subjects are generally taught in silos, but in 2018, the school embarked on a parallel curriculum, which, according to the principal, involves equipping learners in Grades 9 and 10 with *"a broader base of skills"* aimed at *"developing their [the learners'] thinking and who they are as young people with the idea that theoretically that feeds into make their core curriculum leading to that exam but stronger"*. He added, *"We've got this exit exam which we have to prepare the boys for 'cause that's what they've got to write and what gets them the piece of paper that get them into the next step or tertiary studies, but for me it was looking at what skills we accompany that with"*. The principal noted that the introduction of the parallel curriculum has been one of the most

significant achievements of the school. However, he indicated that *“it’s a bit ad hoc still [and] ... we’re sitting down to really analyse whether we can’t be more deliberate about what those parallel skills need to be”*.

Apart from this curriculum, the school has four module days per year. According to the principal, this is *“an integrated-type of process”* that involves learners in project-type activities in and outside school. The example cited by the principal was a Grade 12 inner city project that focused not only on Geography and History but also had elements of Drama, Art and Life Skills. He concluded, *“I think there’s going to be more and more of that, more and more of the ability to actually say, right how do we make the stuff that you’re going to write at the matric exam more understandable and relevant and fluid so you can use it across things”*.

Nevertheless, he emphasised that,

I’m not one in favour of collapsing the curriculum into unrecognisable amorphous projects. I think there’s place for that but ... ultimately, they’ve still got to write that entrance exam, that exit exam in History, in Science in whatever. So, they’ve got to have a sense of what those silos are, even though I hate the silos.

Like Queenstown College, Duke’s has embarked on a transformation and diversity initiative that means there is a concerted effort to harness learner diversity in the classroom.

5.3.2 Digital Technologies at Duke’s College

During my period of observations, it was evident that there were technological challenges at the school; hence the ‘rip and replace’ and network modernisation that was scheduled to occur one week after classroom observations at the school. Although there was access to a plethora of digital technologies, such as data projector, a Promethean board and at least two speakers with Wi-Fi in each classroom throughout the school, it was clear that there were several challenges regarding teachers and learners accessing the wireless network. Liam stated the following:

At the moment, teachers are frustrated because the children, when they are given tasks on Moodle, Google Classrooms, Microsoft, whatever it is, kids can’t access the internet.

They can't access the wireless, so they can't actually use technology in their classrooms effectively as a tool because technology doesn't support it currently.

According to Liam, it was hoped that with the upgrades *"students will be able to seamlessly connect to the wireless, single sign-on, which means that we don't have to worry about usernames and password"*. Additionally, Liam stated,

If the kids want to watch a YouTube video, they switch to data and they watch it on their data. Some of them aren't allowed to use their data or they are not given data, so now they can't do anything. They can't access any of the resources that the teachers are giving them; whereas, with the new system, they'll be able to stream in 2k, even up to 4k, depending on how many users are on the system, but more importantly, they'll be able to submit work without any hassles.

In my interview with the principal, he reiterated the importance of digital technologies and indicated that the College has an IT usage policy. He saw the use of technology as *"a good repository for material"* and a *"research tool"*. He noted the following:

Every specific course material, be it rubrics for your assessments or whether it be source material for you to work with, so as a repository I think it's an important element. I think as a research tool, if it is well used it can be, not so much in class but guiding them to think that way.

Despite the technological challenges, however, the use of digital technologies is an integral part of the school, which has a bring your own device (BYOD) policy. This means that learners have the option to choose any device, be it an iPad, any tablet, a laptop or their smartphone, for pedagogical use. Teachers are provided with a laptop by the school and learners who cannot afford a laptop are generally provided one by the school.

The school therefore has a 'mixed environment', as described by the IT Director, as it is not wedded to one particular operating system or platform. Hence, teachers are free to use Google Classroom, Microsoft programmes or Apple products. The learning management system used by the school at the time was Moodle, but Liam described it as *"clunky and old-fashioned"*. He

added, *“I’m not a big fan of Moodle. It’s very old. It has its place, but I believe we should be using Google Classroom instead because students can access it a lot quicker, a lot easier”*.

Liam therefore has a vision for the adoption of digital technologies at Duke’s College that he said has been presented to the school. Since his employment, he has introduced coding and robotics IT sessions in a number of grades. He added the following:

So, we’ve worked backwards. I’ve gone to the top end. I’ve gone to my College. I’ve said to my Grade 10, 11 & 12 IT and CAT [Computer Application Technology] teachers, I said, what do the kids need in order to do this with you? What are they able to do when they come to you? And what skills would you like? They said when they come, they need to start from scratch. We have to teach them basic programming ... Grade 8s and 9s are doing their own little robotics thing ... They’re learning how to build robots ... What are the Grade 7s doing? Nothing.

The interview data suggested a lack of sustained teacher development at Duke’s College. In response to the question about training in the use of digital technologies, Alice indicated that the only training she has attended since being at the school for four years was the iPad summit. However, she stated,

I fail to see where I could bring in those ideas [since a] lot of the iPad summit was sort of focused around primary, prep school going kids, and so while some of the things were quite fun or some could be used for starter or plenary sessions, I didn’t really find much in terms of enhancing the actual teaching process of the main body of the lesson.

She added that her knowledge about the use of digital technologies and how different applications could enhance learning was gained at a previous school.

Marie, who was quite new to the school, indicated that she too has not received a lot of formal training in the use of digital technologies, but she said, *“I figured most of it out myself”*. She also attended an iPad summit and *“something around Google”*, but she stressed, *“Quite frankly, the courses that I’ve been on have not been that useful to me. I’ve found that the best thing to do is to just fiddle around”*.

Liam, the IT Director who had been employed by the school *“to sort out the issues with technology”* has started arranging for more teachers to be trained in the use of digital technologies. As part of this plan, he stated, *“I’ve sent a lot of the teachers over the last few months for Google training where they do Google Certified Educators Level 1”*.

I raised the issue of learners being distracted by technology, which was a concern of the English and History teachers, and enquired if there were any plans to monitor learners’ use of technologies when the upgrades had taken place. He responded that it was the children’s choice what device and apps they used every day, and it was the parents’ responsibility to train and guide learners in the responsible usage of such applications. He further stated that they as teachers could only encourage learners to be responsible users of technology but that *“it would be illegal for them to monitor and manage their [learners’] use of tech [and] the school would be infringing on students’ rights”*.

In summary, the challenges with digital technologies and the ‘rip and replace’ at Duke’s College, and their approach to the use of digital technologies appeared fragmented. While the IT Director indicated a focus on teacher training and developing learners’ computer literacy skills, including the introduction of robotics, programming and the introduction of augmented reality, there seemed to be no clear strategy for the integration of digital technologies into teachers’ classroom practices.

The next section examines the appropriation of digital technologies in the History and English classrooms.

5.3.2.1 Appropriation of digital technologies in the History classroom

The History classroom was equipped with an old smartboard and a whiteboard at the front. On the teacher’s desk was her laptop and on the ceiling a data projector was suspended. Speakers were mounted on the front wall of the classroom. During our interview, the dominant word used by Alice to describe the use of digital technologies was ‘problem’, and this included her views on the internet connectivity at the school. She explained it as follows:

One of the big problems that we had with the iPad is that when you're standing in the front and you're busy teaching and you're going through something that they could download, a lot of them would switch screens and be playing and actually not working on the work, and there was no ways or means of controlling that.

Alice stated that when learners are allowed to use smartphones and iPads in class, several of them are off-task and generally playing online games like Fortnite. This highlights the tension between the teacher's and learners' perception of the technology.

Another problem she mentioned related to learners cheating during tests that are administered digitally. Alice said, *"For a lot of the quizzes that we do... but for Grade 8s, a lot of them were taking screenshots of the quiz answers and sending them to other friends. So that was a huge problem in terms of test reliability and validity"*.

So, despite the numerous problems encountered with the use of digital technologies, the school does not allow for any form of monitoring, which Alice explained as follows:

Apple does have things where you can block certain things but that ... hasn't been rolled out as far as I know, and we haven't been shown how to use any software that only allows you to deal with whatever you allow the kids to deal with in the class.

This confirms the IT Director's comment during our interview that the school does not enforce monitoring applications. As a consequence, although learners have access to many forms of digital technologies, they are prevented from using them in Alice's History classroom, and as such their various affordances are not exploited. Digital technologies were only used in four of the eight lessons observed. The first thing learners were required to do as they entered the History classroom was to put their smartphones into a basket. Other devices were kept in their bags. These phones were returned only after the lesson. Alice said, *"You have to be very, very strict about how you control the IT use in the classroom or the digital use in the classroom"*. However, she indicated that she allowed learners in older grades to use their smartphones *"to look up things"* because, she is not *"the fount of all knowledge and I certainly don't know everything, so you need to go and have a look and research it yourself"*. The above comments indicate that

learners use their devices only for research, and thus, the emphasis is on learning *from* technology.

The use of digital technologies in the History classroom was therefore very controlled by the teacher and mainly to show history documentaries and to project visual images on to the smartboard. Alice highlighted the importance of exposing learners to documentary films and videos, which in her view help enhance the subject. She stated, *“For me personally, as a teacher, I use the internet a lot for learning, for videos. I watch lots and lots of documentaries and videos. So, for me, that is the most effective and that’s particularly for History.* Alice’s comments demonstrate an awareness of the multimodal possibilities afforded by documentary films and videos and their ability to deepen the learning experience. Table 5.16 shows extracts from two lessons in which a World War I documentary was shown.

Table 5.16: Lesson 4: World War I

Lesson 4: World War I <i>Teacher 1; learners 2</i> <i>As the learners arrive, the teacher collects their cell phones and puts them in a basket.</i> 1. She tells them to take out their booklets and says they’ll be watching a documentary film, <i>Coward</i>, which is a World War I film. She takes out her laptop, puts on the data projector. - As she is setting up, she speaks to the boys about the film they’ll be watching. <i>There’s a 17 minute class discussion about some of the issues in the documentary before it is shown.</i> 2. The class then watches the video for about 25 minutes with the teacher pausing regularly to highlight important issues. Lesson 5: Continuation of documentary 1. The teacher tells the boys they will finish watching the documentary film <i>Coward</i>. She reminds them of the reason for watching the film: to get an idea of shell shock; to remember that the British government branded the men traitors and defectors, and they were executed. <i>They watch the last 7 minutes of the film, which ends with the execution by firing squad of one of the soldiers.</i>

The extracts in Table 5.16 demonstrate the representative use of technology as learners were able to learn from the documentary film about the health consequences of the war. Although the documentary was downloaded, the multimodal content was still accessible due to the technological affordances of the laptop and the data projector. Alice indicated that the film was downloaded because of the unreliability of the Wi-Fi connection on the side of the building where History classroom is located. She stated, *“The biggest problem, and I think I probably would use technology a bit more, is the issue of Wi-Fi connection. So, it’s a huge problem. It’s always been a*

problem. I know they're trying to sort it out but I don't see it getting any better. ... That Wi-Fi connection makes a huge difference".

Alice also projected downloaded images of posters about World War I and propaganda cartoons from the war onto the smartboard since the ones in the learners' booklets were not very clear. She told them that these images can also be found on the school's Moodle, which did not seem to be used widely. Together the teacher and learners analysed the images. The use of the smartboard and the available technology to show projected images did not augment the task except to make the images more visible. In fact, the smartboard in Alice's History classroom was only used as a presentation tool to show downloaded content such as videos or images, as the affordance of interactive was not harnessed. As Alice explained, *"The capabilities of that smartboard are not as great as the ones that I had in [a previous school], so I haven't really used it at all"*. The outdated software on the interactive therefore seemed to be a deterrent to interactive use. The use of technology in this way can again be described as representative as there was no functional change to the task.

In summary, Alice only harnessed the affordances of multimodality and accessibility to some extent because she felt that learners would have been distracted and the technical capabilities of the technologies at her disposal were not great; hence, their affordances would have been limited. Consequently, digital technologies were not frequently used, and when they were, it was in a representative sense by the teacher to transmit information. This was seen in the projection of images for cartoon and poster analysis and to show a downloaded video. Nevertheless, a lot of discussion and debate were generated around the multimodal texts.

The next section examines the English teacher's use of digital technologies.

5.3.2.2 Appropriation of digital technologies the English classroom

The following is a description of my first day of observation in the Grade 9 English classroom with the same group of learners as the History classroom:

I arrive before the learners and sit at the back of the classroom. Little by little, the boys noisily arrive in class. Eventually, there are 19 of them in the room. The lesson starts 10

minutes late. Marie greets them, introduces me, then tells the boys that she has set up a Google Classroom for them. A password is projected from her MacBook onto the smartboard. The teacher suggests that they use Google Chrome as their browser. Some learners use iPads while others use their smartphones. One learner uses his laptop. Several of them indicate that they are having difficulty connecting. The class becomes unsettled, and the noise level again begins to rise.

The teacher decides to do a breathing exercise with the boys to get them to settle. She projects some geometric shapes from a relaxation app onto the white board and leads the boys in a breathing exercise. They are less agitated, and Marie returns to Google Classroom. She now demonstrates how to attach their assignments as docs or pages or suggests they take a screen shot and attach the document as an image if they have difficulties. A few of the boys are still unable to sign into Google Classroom, and one of them says that it is his father's iPad so he cannot sign into his Google account.

After a period of about 10 minutes, 16 boys have successfully joined Google Classroom. When the teacher finished sharing the task for their next lesson, the noise level again rises. And from where I am seated, I can see that four of the boys are captivated by a video that is clearly unrelated to the task at hand.

The above description highlights key characteristics of this English classroom and the multitude of digital technologies present in the classroom. These include the teacher's MacBook, a data projector, a smartboard, Wi-Fi connectivity and learners' iPads and smartphones and a laptop, which are evidence of the school's BYOD policy. It also marks a vast contrast between the History and English classrooms with the same group of learners. Additionally, the above description immediately brings to the fore two challenges: The problem with Wi-Fi connectivity, which was mentioned by the IT Director and the English teacher, and learner distraction with technology which was also raised by the History teacher. Marie's use of Google Classroom was immediately apparent. This was shared early in my interview with her as she stated the following:

The platform that I found the most useful is the Google suite, the GSuite, so I use Google Classroom extensively. They don't use it a lot here, but I'm starting to use it more here.

Google Classrooms is fantastic for communicating information to the kids in a single platform. There's a lot of different ways you can communicate the information. And then what's even better about it is that you can monitor the uptake of that information. You can set tasks. It records the information as they come in. For me it takes away an enormous admin load.

The above comment and previous description indicate Marie's awareness of the various affordances of digital technologies and how to actualise them in the classroom. However, learners who did not have computer literacy lessons as had been indicated by the IT Director, were not familiar with the Google platform, and hence, Marie needed to incorporate brief computer literacy lessons into her English classes to show learners how to attach files and submit assignments via the platform. These brief computer literacy lessons were examples of Jonassen's (1996) learning about digital technologies in a contextualised manner. It also demonstrates the affordance of the Google Classroom as well the constraint of learners not knowing how to use the platform.

By setting up Google Classroom, Marie was able to administer quizzes with immediate feedback to learners, receive assignments and verify which learners had submitted their assignments, and like she stated, monitor the uptake of information. Table 5.17 is an extract from Lesson 6 where learners were given a quiz via Google Classrooms to assess how much they had learnt from a group task.

Table 5.17: Lesson 6: Quiz

Lesson 6: Quiz

Teacher 1; learners 2

1. The teacher projects the Google Classroom code onto the board.

Some learners use their phones and others their tablets.

1. The teacher invites them to join www.quizziz.com by using the code which is projected.

One boy doesn't have a device so can't do the quiz. The teacher ignores him.

As the others log on, their names are shown on the screen.

14 minutes later the boys with devices have all joined and this is reflected on the screen.

2. They do the test in 10 minutes.

As the boys answer the questions, their score is projected on live the screen.

2. They are all excited.

In the end their final scores are displayed. There is 56% accuracy. Only three persons scored over 70%.

1. The teacher then says they need to do some reviewing as it is clear that the information that they got from their colleagues wasn't correct.

Later in the lesson.

Learners have a few minutes to work on their assignment. Eight of the boys opt to do the quiz again to improve their scores.

Three boys are still on social media; one is playing solitaire on their phones.

The immediacy afforded by the technology allowed learners to receive and see their scores live. This recursive feedback afforded by integrating the quiz into Google Classroom motivated some learners to redo the quiz to improve their scores. Administering the quiz via this medium is an example of the representative use of media and the teacher harnessed the affordances of immediacy (Conole & Dyke, 2004) and recursive feedback (Cope & Kalantzis, 2017). Her comments in the following quote indicate an awareness of the affordances and limitations of the online quiz:

Google Classrooms has been the best for me in terms of admin and then I've got a very little programme called Quizziz. It's an online thing. It's like Kahoot but it's a little bit nicer than Kahoot. That is surprisingly effective. It's small but it does the job for certain things. So, it's a very good revision tool. So, if I've taught something and I just need to check that they ... I want to see whether that class has picked all of that up, Quizziz, is fantastic because kids; it's quite fun for the kids and they'll just, they think it's a game and so they quite enjoy doing it. It gives really good reporting so what can happen is that I can see which of the kids are really not answering any of the questions well and which of them are and that's fantastic and that's been useful. So, it has quite a limited function.

During a subsequent lesson, the teacher projected the Google Classroom onto the whiteboard and showed learners that only 14 out of 23 of them had submitted their assignments. This was again possible because of the immediacy of the technology and the affordance of recursive feedback and monitoring.

After the quiz, learners were asked to work on an assignment to be submitted via Google Classrooms. This task required them to conduct research on the internet to “*create their own piece of protest art or writing about something that you believe is a problem in society today. You*

can write a song, create a spoken word poem, a poster or a piece of graffiti". Table 5.18 shows the instructions that were provided by the teacher for their submission of the task.

Table 5.18: Lesson 6b: Protest poetry assignment

Lesson 6b: Protest poetry assignment <i>Teacher 1; learners 2</i> 1. The teacher suggests that they (learners) work on their assignment and explains that they have to submit on Google Classroom. The Google Classroom screen is projected. - She tells them that the ideal would be slides: "The reason why they should use slides is because it's going on to your G-drive. If you're not familiar with slides, and you don't want to chance it, then you can use PowerPoint or keynotes ... not pages. It's got to be a PowerPoint or a slide show okay ... There's method in the madness. This is like a low-key non-stress version of putting some slides together. I want you to play around with the slides and make sure they look okay. You're going to be using slides and presentations going forward so you might as well just get familiar with the formatting. The advantage of using slides in Google is that you save it more easily but if you are more familiar with keynote or PowerPoint, I'm okay with that. Try and play around a little bit. Get some pictures in there, change the font, change the settings, make it look good. It's a presentation. That means there's an aesthetic component to it"

The assignment in Table 5.17 gave learners the choice of presentation applications for the task. The teacher emphasised the aesthetics while indicating the various features learners could use to improve the presentation. This task therefore had the potential to be transformative in its use of digital technologies if learners harnessed the various features of the presentation applications to learn with technology. Apart from multimodality and nonlinearity afforded by the use of technologies for this assignment, the accessibility of multiple sources of information can contribute to active knowledge making.

At the start of Lesson 7, the teacher opened Google Classroom to check how many learners had submitted their assignment. However, some of them indicated that they had difficulty uploading their work. She tried to troubleshoot some of the issues but encountered problems with the Wi-Fi, causing her to comment "*the Wi-Fi is rubbish*". Learners were then told to submit a hard copy of the assignment. The lesson continued with learners taking two online quizzes evaluating their learning styles. These were not administered via Google Classroom as they were not part of their learning tasks for the term. Most of the learners did the shorter quiz and complained that the other was too long, and a few took the opportunity to check their social media on one device and do the quiz on another. Two learners used their iPads to play a multiplayer game online with one of them shouting, "I say, shoot!".

This lesson again indicated some of the challenges faced with technology at Duke's College, providing rationale for the 'rip and replace' that was mentioned by the IT Director, as well as the distractions that occur, especially when learners are not monitored and have more than one device. This lesson was another example of representative use of media and the distractions of technology.

Another way in which Google Classroom was used was to set up Classcraft, which was used as a way to manage learners' behaviour through a game since they had been frequently distracted in class. Table 5.19 is an extract from the lesson.

Table 5.19: Lesson 8: Classcraft setup

Lesson 8: Classcraft setup Teacher 1; learners 2 1. The teacher tells the boys that they'll be doing something new because she doesn't get the sense that they're fully focused, and she's a bit worried. - She asks, "Has any of you played RPG. Do you know what's RPG?" She explains that it's role play games. - She explains that they will be playing Classcraft where they can choose characters like warrior, healer or magician and do things to earn rewards and get powers or punishment. For example, if you are a healer, one of the powers could be that you can redo an assignment. - You may also be able to use your notes in a test. - She tells the boys that they can be in groups of between 3–6 persons and asks them to choose their groups. <i>The first task for the boys is to choose their teams. While they are doing this, the teacher projects the rules of the game from Google Classroom.</i> 1. The boys are told to choose a crest or an avatar for the team. 2. The boys communicate their team's name, their avatar and the members of the team to the teacher. 1. The teacher adds the information and drags and drops their names into the various teams. - She then asks the boys to download the Classcraft app while she is adding the teams. - They have to sign in with their Google Classroom account. 2. One boy asks, "Ma'am are all the classes doing this?" 1. She replies, "No". 2. Another says, "It's because we're unique". 1. One boy says that he's not able to download because he only has 8% storage. - The teacher reminds the boys to sign in using their Google Classroom login once they've got the app. <i>A video clip of the game is played as the boys watch.</i>

The use of Classcraft was an innovative attempt to 'gamify' the classroom. The Classcraft app was linked to Google Classrooms and the learners were required to download the app, create profiles and log in to the game with the assistance of the teacher. They were told that they would be

working in teams and that with this game they would be able to get rewards and powers, which they could use, and that they could lose points if they failed to submit assignments or their behaviour was poor. However, during the period of observation, the game was never used.

Marie's harnessed the affordances of diversity and multimodality and nonlinearity by selecting music videos for pedagogical purposes in her poetry lessons. This was observed during Lessons 2, 3 and 4 for the study of protest poetry. During Lesson 2, learners watched and discussed Pink Floyd's song *Another Brick in the Wall*. Table 5.20 is an extract from the first part of the lesson.

Table 5.20: Lesson 2: Protest poetry

Lesson 2: Protest poetry <i>Teacher 1; learners 2</i> 1. The teacher takes out her MacBook and tries to connect to the internet. 2. The boys arrive for the lesson. 1. She says, "The thing I wanted to play isn't working because we don't have internet". - She decides to use her smartphone instead. - She mutters, "The Wi-Fi is rubbish". - She turns on projector and connects her phone to the data projector. <i>The YouTube video is projected onto the white board.</i> <i>Music video: Pink Floyd's Another Brick in the Wall is shown.</i> 2. Most of the class are watching the video. - Three boys at the back of the class are checking their phones. Not really watching the video. One close to me seems to be on social media. Two boys are on their iPads.

In the above extract, there is the first evidence of internet connectivity problems as was previously observed. Initially, Marie had intended to use her MacBook to connect to the internet. However, she was unable to connect using the school's Wi-Fi so she used her smartphone and her data to connect and project the YouTube video onto the whiteboard. She did not allow the problems with internet connectivity to derail her lessons.

In Lessons 3 and 4, learners used their iPads and smartphones to watch YouTube videos of the protest songs they were studying for poetry. During Lesson 3, learners quietly read through the lyrics of seven different songs of protest written in their booklets. They then selected the ones they liked and watched those music videos on their devices. So instead of one poem, learners engaged with several poems, allowing for a diversity of multimodal experiences. The following day, learners again watched their preferred song. Having learners engage with the music videos

of the various songs of protest allowed them to have a richer experience of the multimodal texts. They conducted online research on their chosen poem, visiting different websites that explored the lyrics of songs and engaged in a discussion about the content and contexts. So, although technology was being used in the representative sense to transmit information, with a focus on learning *from* technology, the accompanying activities can be described as generative. Additionally, the poetry lesson was enhanced by the various learning possibilities the technology afforded.

Marie's use of digital technologies clearly indicates high technological self-efficacy as well as awareness of the affordances of the available technologies, thus contributing to a diversity of experiences and activities. Because of the affordances of such technologies, she was able to present and allow learners to experience multimodal activities made possible by the accessibility and immediacy of the technologies. This is despite her not having *"a lot of formal training"* and only attending an iPad summit and *"something around Google"*. However, she had not found the courses very useful and felt that *"the best thing to do is to just fiddle around"*. She explained, *"I've experimented with a lot of apps and technologies, and some I've retained and some I've discarded, and most of it I've kind of figured out for myself"*.

However, despite Marie's confidence in using various pieces of technology, her stated preference for using Google Classrooms and the frequency and ease with which she used digital technologies in the classroom, she indicated that she was not *"a massive fan of excessive technology use in the classroom at all"*. She added that *"phones are an obstacle in the classroom"* and shared the following concerns:

If I ask them to do something on their phones, that can work for a little while like Quizziz does ... But if I were to ask them to research something and set out sort of a broad thing and say, 'go and research this', that doesn't last very long either, unless I have a very structured activity to go along with it.

Marie's comments were confirmed during observations of her lessons, and in some of the extracts it was evident that on many occasions learners were distracted by their mobile devices and spent a lot of time playing games and on social media instead of on the classroom tasks.

Hence, she concluded that the use of digital technology did not necessarily improve the teaching experience. Her belief surrounding the use of digital technologies for teaching and learning therefore did not match her enacted classroom practice.

In summary, Marie's use of digital technologies could be described as both representative and generative with the harnessing of multiple digital affordances like recursive feedback, multimodality and nonlinearity, diversity and accessibility and ubiquity. Learners were given the opportunity to learn *from*, to learn *about* and to learn *with* digital technologies through a variety of multimodal activities. Nevertheless, the frequent distractions of social media and other applications interrupted learning in many respects.

5.3.3 Teachers' Pedagogical Practices at Duke's College

This section looks at the pedagogical strategies of the History and English teachers

5.3.3.1 *Patterns of interaction in the History classroom*

Alice's History classroom had different configurations depending on the task. But generally, chairs and tables were arranged individually in rows facing the teacher's at the front of the room. For the group carousel activity, the chairs and tables were pushed to the perimeter of the room in a horseshoe arrangement, allowing space for learners to move easily from station to station. For the other group task, learners moved their chairs and tables next to the person(s) in their respective groups. Alice's lessons were characterised by a high level of interaction between herself and learners as they made sense of the content about World War I. She explained that the use of digital technologies provided another dimension to the lesson as learners *"interact totally differently with media than they do with the teacher"*. She added that it is *"a little more tangible for them and they enjoy it more. It's a break from me standing doing the traditional 'chalk and talk' type of thing"*.

During Lessons 4 and 5, learners watched the documentary film *Coward*. In our interview she explained that she used movies and videoclips as they helped to support and explain a topic in a different way. She further stated, *"I usually teach it and then I get them to watch a video and we use that video for further explanation, to expand. I think for those people who are a bit more*

visual and less auditory, it's beneficial". Alice first introduced the documentary with a brief discussion about one of the key issues in the film, the issue of shell shock, one of the medical conditions of the first world war, which the class had been studying. Table 5.21 is an extract that details how the discussion unfolded.

Table 5.21: Lesson 4: Documentary film Coward

Lesson 4: Documentary film Coward <i>Discussion before the film</i> <i>Teacher 1; learners 2</i>	
1.	As the teacher is setting up, she speaks to the boys about the film. She says the last part of the film looks at the issue of shell shock. Men were executed because of symptoms of shell shock. Their behaviour was interpreted as cowardice. They were court martialled. She then asks, "What is a court martial?"
2.	One boy says judge. "It is basically like a court where you explain why you shouldn't be killed".
1.	The teacher confirms that it's a judgement that takes place in a military court either for the army or the navy.
2.	A learner asks the teacher if she saw the movie <i>Hacksaw Ridge</i> , and if it would be classified as a court martial.
1.	The teacher says yes and adds, "It's when you're tried not in a civilian court".
-	She continues to explain the documentary.
2.	One learner asks, "Did people fake it to get out of the front line?"
1.	The teacher says yes and refers to a <i>Blackadder</i> clip which the class watched previously in which someone was faking being shell shocked.
2.	Another learner asks, "Won't it be evident compared to someone who is experiencing shell shock?"
1.	The teacher responds, "I don't know. It would be hard to differentiate".
-	She refers to a recent news item which stated that only recently the British government recognised shell shock as a genuine disorder.
1.	She asks the boys if they have seen the film <i>The Imitation Game</i> about a homosexual mathematical genius who was not given the recognition he deserved. She adds that the contributions of Blacks were not recognised as well.
2.	One boy asks, "Why would Black people and gay people go along with this without protesting?"
1.	The teacher replies, "A lot of people protested". Then adds, "I don't want to be the only one speaking".
-	She continues, "Just think about power. Power is different. It was a time in society when Black people weren't seen as equal. The power rested with white people. Black people fighting in the war were not given weapons."
-	"It was a time when homosexuality was considered a criminal offence."

It was immediately apparent what the teacher's strategy for engaging the learners was. She employed a questioning style that encouraged discussion and elicited learners' views. At the beginning of the discussion she asked, "*What is a court martial?*" One boy responded, and the teacher elaborated on his response. This in turn activated a memory in one of the boys who

followed up with a question about a movie in which there is a court martial incident. Alice next referred to a BBC series and a recent film in which the issue of shell shock was highlighted. In the above extract we see that the learners were not reticent about asking questions, and there was a very interactive session with multiple modes of interaction. There was high student-content interaction as learners were engaged in viewing the documentary. This was interspersed with medium teacher-student interaction as the teacher paused the film for explanations and to ensure that learners were understanding pertinent issues in the film. In addition, there was low teacher-student-content interaction as they briefly discussed issues relating to power and discrimination.

This combination of modes of interaction was evident throughout many of the History lessons observed. In Lesson 5, there was low student-content interaction as learners concluded the watching of the documentary film. The next part of the lesson was characterised by high teacher-student-content interaction and low teacher-student interaction as the class discussed the use of propaganda, which was the next World War I topic in their handout, while referring to current examples of propaganda.

Other examples of interaction when technology was used occurred during the analysis of propaganda posters to identify various propaganda techniques and World War I cartoons. These occurred during Lessons 6, 7 and 8. Table 5.22 is an extract from one of the lessons on poster analysis.

Table 5.22: Lesson 6: Poster analysis

Lesson 6: Poster analysis <i>Teacher 1; learners 2</i> <i>Next activity: Poster analysis</i> 1. The teacher tells the boys to work in pairs for 10 [minutes] looking for different propaganda techniques and analysing them in detail. - The teacher projects the posters on the board as they are not clear in the booklet. The posters are also on the school's MOODLE. 2. Some groups seem to be working well and are deep in discussions. - The pair next to me are arguing as one of them was not keen on discussing his answers with the other one whom I overheard him say was 'lazy'. <i>As the boys work, the teacher walks to check that the boys are getting on.</i> 1. After 7 mins. she asks, "Should we do the 1st one together?"

2. The boys respond, "Yes".
 - The boys point out that the poster appeals to a man's sense of duty as emotive language is used.
1. The teacher asks them to describe the type of society being portrayed.
2. The boys suggest patriarchal.
1. She then asks, "Who is the poster targeted towards?"
2. Some suggest women, others suggest men.
1. The teacher reads, "Women of Britain, let your men go and fight. Why?"
 - "How can you get other marks? You get one mark for identifying techniques."
2. "By explaining why?"
 - Another learner asks, "Can you say that this appeals to a man's guilt?"
1. The teacher affirms. Then says, "You just have to justify it".

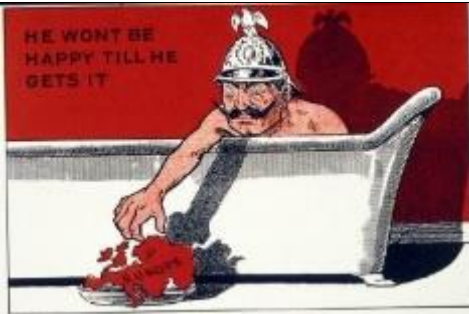
Since this activity occurred during the last 15 minutes of the lesson, there was low student-student interaction as learners worked together to make sense of the posters. One particular group was not collaborating as was expected. The teacher, having observed that the group were not working well together, quickly suggested that they analyse the poster together. There was also low teacher-student-content interaction as the teacher and learners jointly analysed the content of the poster. Poster analysis continued during the following lesson as the teacher and learners again worked together to analyse another poster, which represented high teacher-student-content interaction. This continued with a discussion about conscription into the army.

In Lesson 8, an extract of which is in Table 5.23,, two modes of interaction were evident. There was teacher-student-content and teacher-student interaction during the analysis of the cartoons, which used techniques similar to those used to analyse propaganda posters. However, in this lesson there was more input from the teacher as she explained the content of the two cartoons being discussed. Table 5.23 is an extract from one of the discussions.

Table 5.23: Lesson 8: Cartoon analysis

Lesson 8: Cartoon analysis

Teacher 1; learners 2



Cartoon 1

1. The teacher discusses key points in analysing a cartoon then asks, "What is the cartoon highlighting?"
2. "Alliances."
1. "Where can you see that?"
2. "The helmet."
- One suggests imperialism.
1. The teacher asks, "What is imperialism?"
2. "Conquering."
1. The teacher asks, "Conquering what?"
2. "Land."
1. & 2. There is a discussion about the Dunkirk cartoon, which was produced last year and which was done because of the film.
- The teacher asks the children for the 2nd clue.
2. "He's reaching for Europe."
1. The teacher asks, "Portrayed as?"
2. "Soap. But it's slipping from him."
1. "In other words, what does he want to do?"
2. "Take over Europe."
1. "Is he casually reaching for the soap?"
2. "No."
1. The teacher tells the children to look at both the textual and visual clues. She then says, "He won't be happy until he gets it. What does it mean?"
2. "He's determined."
1. "He's determined. He's focused."
- "Last but not least we want to know the purpose. Why has he drawn the image?"
2. "Maybe showing Britain how vicious and evil Germany is."
1. The teacher says, "We can build on that."

The class concludes the analysis of the poster; then together analyse another.

Apart from the interactions that took place with digital technology, a number of interactions in this classroom occurred without the use of any form of digital technology.

The first evidence of student-student interaction was observed on the first day of observations. Prior to classroom interactions and after their study of World War I trench warfare, learners were tasked with making 3D models of trench warfare in groups. These models were on the desks at

the back of the classroom and were being peer assessed over a number of days. When learners arrived for the lesson, they were asked to arrange the desks around the perimeter of the room to allow for easy movement in the classroom. There was a brief period of teacher-student interaction as Alice presented information on various medical discoveries made during World War I. Learners took turns reading from the handout with frequent pauses for explanations, questions and clarifications. The teacher used frequent questioning to engage learners with questions like, “*Who’s been for an x-ray?*”, “*Who’s had a blood transfusion?*”, and “*Who knows their blood type?*” What followed was high student-student interaction as learners were asked to form 10 groups of two and one group of three and were tasked with summarising the information on various World War I illnesses contained in their handouts. These notes were to be represented on large pieces of flip chart paper in the form of ‘spider’ diagrams. One learner read the information and discussed with his partner who drew the diagram and together they discussed what to record.

During the second lesson, there was low student-student interaction as the learners completed the task. Student-content interaction at a medium to high level occurred as learners were required to move from station to station in carousel format to copy information from the different spider diagrams and record it into their booklets. They immediately began to extract information from the pieces of paper, asking questions, seeking clarifications from other group members and even commenting on each other’s spelling and grammar. Table 5.24 shows how the lesson unfolded.

Table 5.24: Lesson 2: World War I

Lesson 2: World War I <i>Teacher 1; learners 2</i> <i>As soon as the boys enter, they are required to put their cell phones in a basket.</i> 1. The teacher tells the boys to take off their blazers. Not to move the desks. - She mentions that voting has started on their World War I trenches. These will conclude the following break. - She then says that they will continue with their group work from the previous lesson. <i>The boys get into their groups. The teacher distributes the flip chart papers with spider diagrams from the previous day’s activity.</i> 1. The teacher tells them to open their workbook to the page with the grid. They need to start at their sheet and copy the relevant information from the sheet into their booklets. They will then move

around the room, like a carousel or in a clockwise fashion, and write the information from the other sheets.

The teacher projects a stopwatch in the shape of a bomb onto the board. When the learners hear the bomb, they have to move to the next desk. The bomb goes off every 3 mins.

2. The boys copy the information from the sheet and chat with each other to seek clarification or check accuracy of information.
 - For 1 or 2 other groups, one person reads while the other copies.
 - One of the posters doesn't have all the information. The boys advise the teacher and instead make notes from the information contained in their booklet.
 - Some boys point out a lack of detail in the shell shock poster.
1. The teacher advises that doctors didn't really know how to treat the condition at the time. She adds that they will go into more detail later.
 - The teacher moves around the room checking that the boys are getting on.
2. One boy remarks, "Some people cannot write or spell."
 - Another asks his partner to clarify a medical treatment.

After the boys had finished extracting the relevant information from the flipchart sheets during the third lesson, Alice reviewed the content to ensure they had grasped the material. While they were extracting the information from the last three posters, she created a mind map of the key illnesses detailed in the booklet on the white board. They then assessed each other's work, and Alice asked, "*Which were the most effective sheets?*" She subsequently uses the mind map to ask questions to consolidate their learning and drill down into the notes. As they responded, she filled in the mind map with the answers they provide. High teacher-student interaction occurred as the class discussed various illnesses and how they were treated. Again, the following pattern was observed: The teacher posed questions; the boys responded; and the teachers asked follow-up questions for them to provide more details, adding to the information by giving examples from the local context or referring to a class trip or a video they had watched.

In Lesson 5, before learners analysed the propaganda posters, there was high teacher-student-content interactions combined with low teacher-student interaction as the class defined propaganda and provided examples of propaganda being used, specifically referring to current and past events. Alice started by asking, "*What is propaganda?*" The response, "*fake news and failing New York Times*" was given. She followed up with "*Who uses that?*". The learners responded with "*campaigning people, businesses, failing politicians*". This was followed by a critical and more engaging discussion that examined the use of propaganda in school, with extremists and in society in general.

In conclusion, Alice's History classroom was an example of the use of multiple modes of interaction at high or medium to high levels. However, teacher-student-content interaction occurred most frequently, and there were fewer opportunities for student-content and student-student interaction.

5.3.3.2 Learning by design in the History classroom

Alice's History lessons provided evidence of the four knowledge processes conceptualising, experiencing, analysing, and applying to make learning meaningful for students. It was immediately apparent in the first lesson that her strategy was to weave between knowledge processes.

During the first History lesson, the class had started to explore a new issue in World War I, namely medical conditions and medical discoveries during that period. The teacher drew on learners' medical knowledge by asking them if they knew where injured soldiers were treated locally. She then informed them that the military were treated at Baragwanath Hospital and that because of its reputation, foreign doctors were also trained there. One learner provided an anecdote of his father being injured while he was in the army. This strategy of appealing to learners' experiences is an example of experiencing, which continued as the teacher further drew on learners' personal and lived experiences by asking who has had an x-ray and how long it took. In addition, she drew on their knowledge of biology by asking if they had studied "aseptic surgery and Louis Pasteur in Biology". Applying their knowledge of biology to the topic being discussed, learners spoke about the spread of bacteria and its consequences when patients were not sterilised in war time during operations. The knowledge processes of experiencing the known and applying appropriately were followed by conceptualising by naming as learners later worked in groups to create spider diagrams of the names of the medical illnesses found in their booklets.

There were other examples of conceptualising by naming and with theory to facilitate the learning of new terms and concepts relating to the topics being studied. So, apart from the use of spider diagrams in Lessons 1 and 2, Alice used a mind map in the third lesson to confirm learners' knowledge and understanding of the information they had written in the diagrams. Table 5.25 is an excerpt from the lesson after the teacher had created the mind map.

Table 5.25: Lesson 3: World War I medical conditions

Lesson 3: World War I medical conditions

Teacher 1; learners 2

Using the mind map as a guide, the teacher goes through the list of medical conditions with the boys.

1. The teacher asks what trench foot is.
2. A learner responds.
1. The teacher writes 'fungal infection' on the mind map; then asks for further explanations.
2. A learner says, "The feet started rotting."
1. The teacher then asks how we deal with it.
2. The boys answer amputation, change socks, put whale oil.
1. The teacher asks why whale oil was used.
2. One boy says, "It's fatty."
1. The teacher asks. "What does it do? Think of a baby's bottom. You put Bepathen."
2. Another says, "It forms a protective layer."
1. She then asks what was used to elevate the men out of the trenches.
2. A learner responds, "Duckboards."
1. The teacher then moves on to trench fever and asks, "What was it".
2. The boys respond, "high temperature, headache, aching muscles and it could last up to a month."
1. The teacher adds "6 weeks" and speaks a bit about flu symptoms. She then asks, "How was trench fever started?"
2. "Lice."

The lesson continues with the teacher going through the various medical conditions with learners and then adding the important words onto the mind map.

The use of the mind map was another way to summarise information from the notes and consolidate learning. Lesson 4, to which I referred previously, was another example of a mix of pedagogical strategies that started with overt instruction as Alice introduced the documentary film the class was about to watch. She provided the context for the film, addressed new terms such as shell shock and court martial, and referred to popular films that addressed some of these issues. During this period of conceptualising, there was a brief moment of critical analysing as they discussed the problem of racism and the castration of homosexuals, which was raised in one of the films. One learner asked, "*Why would Black people and gay people go along with this without protesting?*", to which the teacher responded the following:

... just think about power. Power is different. It was a time in society when Black people weren't seen as equal. The power lay with white people. Black people fighting in the war

were not given weapons. It was a time when homosexuality was considered a criminal offence. The civil rights movement hadn't happened yet.

Learners were then given the chance to experience the effects of the war by watching the documentary *Coward*. The process of conceptualising continued during the watching of the film as the teacher paused for discussions and explanations. Lesson 5 was therefore another example of a blend of three knowledge processes, namely conceptualising, experiencing and analysing.

Alice's strategy of using multiple knowledge processes to make meaning in the classroom was also evident in the fifth and seventh lessons. There were instances of experiencing the known, conceptualising by naming, analysing critically and applying appropriately in Lesson 5, and in the second part of Lesson 7, the knowledge processes of applying appropriately and analysing critically were used. Table 5.26 is a lengthy extract from Lesson 5 after learners had finished watching the documentary film *Coward* and the new topic was being introduced.

Table 5.26: Lesson 5: Propaganda

Lesson 5: Propaganda

Teacher 1; learners 2

(The boys take turn to read sections from their booklet)

1. The teacher asks, "What is propaganda?"
2. The boys respond: fake news; failing New York Times.
1. The teacher asks, "Who uses that?" (i.e., propaganda).
2. "Campaigning people. Businesses. Failing politicians."
- "Won't people use it to make money?"
1. "So, advertising people."
2. "You use it when you're trying to persuade someone."
1. "I like that word. Persuade."
2. "Won't military people use it to get people to join?"
1. "Yes."
- "Do you think they use propaganda in Grade 8 camp when they try to persuade you into thinking that the school is amazing?"
- "So, we'll be looking at propaganda and enlistment? What does enlistment mean?"
2. "Joining the army."
1. "Right."
2. A learner reads for 1 minute
1. The teacher then tells them to use a pen, pencil or highlighter to highlight the definition of propaganda in their booklet.
2. One learner asks, "How can you really influence people to join a war?"

1. "Look at ISIS (Islamic State of Iraq and the Levant). Look at extremism. Have you seen what happened in Christ Church?"
2. The boys discuss the recent attacks in Christ Church New Zealand.
1. The teacher asks, "But why?"
2. "I don't know why."
- "Xenophobic."
- "Nationalist."
1. "How do people get to that?" The teacher asks...
- "The younger you are, the easier you are to persuade." She asks, "Why?"
2. One boy suggests, "you don't know much about the world".
1. The teacher asks why.
2. "When you're young your brain is like a sponge. Easier to believe."
1. "Education is important." She suggests that a young person doesn't have a broad frame of reference. Your ability to think critically is also not well developed.
2. One boy asks, "Doesn't education somehow count as propaganda? They teach you what they want you to believe."
1. The teacher asks, "Who is they? Who used that?"
2. "The apartheid state."

A discussion about how the apartheid state used propaganda to control education.

1. She explains that education is controversial; then asks, "Who controls education?"
2. "The government."
1. The teacher adds, "Not always the government". She refers to Nazi Germany and also the capitalist class. "But why?"
2. "To educate their children to stay on top."
1. The teacher discusses how education is used to control and says that by controlling education, you can control the workforce.
2. One learner asks, "You know how X said, your brain is like a sponge. How does an older person who is educated, get persuaded?"
1. The teacher explains that the majority of the world is not educated. They believe fake news and can't distinguish between what's real and what's fake.
- She adds that we're all in a privileged situation and from a small group of people who are being taught to think critically.
- "If the world is much more educated, why is there more slavery and neo-Nazis?"
- "I'm going to get off my soap-box now. Let's get on with the lesson."

The extract in Table 5.26 starts with the teacher posing a question to check understanding of the word 'propaganda'. The learners' response "fake news" and "the failing New York Times" showed knowledge of current affairs as they drew on their prior knowledge of recent events. The teacher followed up with a question to elicit clarification. To deepen learners' understanding of the term, she referred to their experience of their Grade 8 camp and asked if they thought propaganda was used to persuade learners that the experience would be amazing. The teacher then moved from experiencing the known as a strategy to conceptualising with the question "*What does enlistment*

mean?” One learner correctly responded, after which they were asked to highlight the definition of propaganda in their notes. There was also evidence of critical questioning by learners with one boy posing the question *“How can you really influence people to join a war?”*, to which the teacher responded with a question. This led to further references to learners’ prior knowledge and experiences as they discussed motivations for the terrorist attacks in Christ Church, New Zealand. The discussion that ensued showed critical analysis by learners as well as their application of the knowledge from their English protest poetry lesson to their discussion on propaganda. One learner posed the question *“Doesn’t education count as propaganda?”* and another asked *“How does an older person who is educated get persuaded?”* During the discussion about education as propaganda, one learner mentioned the apartheid state and the teacher referred to Nazi Germany. The detailed discussions that occurred during this lesson therefore exemplify the teacher’s use of multiple pedagogical strategies to make meaning, particularly that of analysing, which Alice indicated was a very important skill for learners to have as they must be able to ask questions like *“How do people manipulate information to further their agenda?”* and *“How dangerous can propaganda be?”*

In the first 30 minutes of the sixth lesson there was a deliberate focus on the process of conceptualising as the teacher consolidated the concepts learnt. She started by reminding learners about the previous lesson, particularly about propaganda and conscription. She then posed the questions *“What is propaganda and why was it used?”* Learners took turns responding while the teacher made notes on the white board, and together they were able to define the term. The boys then took turns reading their booklet as the teacher posed questions for clarifications and asked them to determine what they would highlight. As they offered suggestions, Alice asked them to explain or justify their responses. She therefore involved them actively in the process of conceptualising.

Lesson 7 in Table 5.27 illustrates the peripheral discussion, which Alice said in her interview is important. Though attributed to the watching of videos, the discussion that followed during the analysis of one of the propaganda videos is an example of experiencing where issues from learners’ lifeworlds were brought to the fore. It was evident what Alice meant when she referred to peripheral learning between the teacher and learners around the content of the poster being

studied and how she was able to draw on the local context to improve learners' understanding of the concept of conscription and even extended to the issue of doctors doing community service in the townships. There was a sharp distinction in the response between learners of different racial groupings. These peripheral discussions that drew on learners' experiences and prior knowledge were examples of experiencing.

Table 5.27: Lesson 7: Propaganda—poster analysis

Lesson 7: Propaganda—poster analysis

Teacher 1; learners 2

A poster with Kitchener is projected onto the whiteboard.

1. The teacher points out that Kitchener was involved in the Anglo Boer War. There's a discussion about concentration camps used by the British in South Africa.
 - She also explains that that Kitchener was involved in destroying farms then asks, "What was that called?"
2. "Scorched earth," the boys reply.

They discuss the last poster then start to discuss conscription.

They discuss conscription around the world. The teacher explains that it's service to the country, not necessarily to fight.

1. She then asks, "How would you feel if there was conscription in South Africa? Do you think it would be a way to get people off the streets?"
 - The teacher speaks about the community service that doctors do.
2. One learner says it sucks.
 1. The teacher asks, "Why does it suck?"
 2. "You're really telling me that if I want to be a doctor, I have to go to a township area when you studied for it?"
 - Another suggests, "But you're helping someone."
 - Most of the boys object to the statement.
 - Another boy states that he knows of an intern who got shot while doing his internship in a rural area.
 - One boy says it's an extreme example.
 - Another one asks angrily, "What's the problem of going into the township? Everyone needs help."
 - "You're going to be exposed to a lot of stuff you don't see here in the city, and when you come back, you'll be better."
 - Yet another asks, "That's better?"
 - Another boy says, "It's great but it shouldn't be forced."
1. The teacher asks, "Do you think that it's altruistic that people would volunteer?"
2. "No."
 - "It depends on the situation you have in your life" (says one learner).
 - "I think it's good because if you go into the army, you learn valuable skills" (another learner).
 - "I think you're putting your life at risk going to a rural area" (yet another learner).
 - "The city's crime rate is higher than the townships" (says the young man who is offended).

- “I feel as though what my classmate is saying is based on what someone told him about rural areas and townships.”

The above extract also reveals learners’ freedom to discuss sensitive issues and their boldness to engage critically with such issues and question the views of others.

In conclusion, Alice’s pedagogical strategy demonstrated a mix of modes of interaction as well as knowledge processes as learners were actively involved in the meaning-making process. However, the least frequent mode of interaction was student-student and opportunities for learners to apply their knowledge were few. Her attempts to connect discussions to learners’ lived experiences indicate that she was harnessing their epistemological diversity as a classroom resource. Some of the peripheral discussions about race, crime and experiences in the townships as opposed to the suburbs indicated learner agency and freedom to engage in such discussions. In summary, the many opportunities for experiencing, and in particular, learners’ lived experiences being recruited in the process of conceptualising indicate that the various resources they brought to the classroom were valued.

The next section examines the English teacher’s pedagogical strategies.

5.3.3.3 Patterns of interaction in the English classroom

Marie did not have her own classroom, so she shared two different classrooms that both had the same configurations: Individual chairs and tables arranged in rows facing the teacher’s desk at the front of the class. Learners would move the chairs and tables closer for groupwork. However, this did not occur very frequently. Instead, the dominant mode of interaction in Marie’s English classroom was student-content interaction involving the use of digital technologies. During our interview, she commented that there is better engagement between the teacher and learners when such technologies are not used, but “*learner-teacher engagement does not exist as soon as you throw technology into the mix*”.

As an introduction to protest poetry, Marie introduced the song *Another Brick in the Wall* by the band Pink Floyd, which protests against the system of education in the 1970s. Marie first played the video without indicating its context or purpose. She then asked learners if they knew the song, to which there was no response. Some learners were busy on their phones and not

engaging with the lesson, prompting the teacher to shout, “*What are you doing? Are you on your phones?*” Initially, there was a period of low teacher-student interaction interspersed with low student-content interaction as learners watched segments of the video. This was followed by medium teacher-student-content interaction that followed from a seemingly frustrated learner asking “*What are we supposed to get about the video?*” The teacher used a series of questions to help him and the class make sense of the message of the song and to link it to their own education. Table 5.28 is a short extract from the interaction.

Table 5.28: Lesson 2: Protest poetry

Lesson 2: Protest poetry

Teacher 1; learners 2

The YouTube Video is projected onto the whiteboard as some learners watch.

1. The teacher plays the video again; then pauses to ask, “Do you know the song?” No response. She then says, “Give me a decade”.
2. Some suggest 70s and 80s.
1. The teacher says, “This is the 60s”.
1. & 2. There is a brief discussion about the fact that education hasn’t really changed except for corporal punishment.
2. The teacher writes the lyrics of the chorus on the whiteboard.
- “So, you’re aware that’s how you’re being taught today. You’ve kind a got the same sort of discipline. You’ve got the same ...”
- She shouts. “What are you doing? Are you on your phones? That’s such rubbish. It’s exactly the same as what’s happening in the video!”, says the teacher to the boys on their phones.
3. “But we don’t get beaten.”
1. “That’s the one thing that’s changed. You don’t get hit anymore.”

She continues the video.

1. She adds that they are protesting against the system of education and asks, “What do they say is wrong with the system?”
2. A few learners respond, but I can’t hear them clearly.
1. The teacher adds, “We’re churning out the same people. It’s just a machine.”
2. A learner asks, “WHAT ARE WE SUPPOSED TO GET ABOUT THE VIDEO? I DON’T GET IT.”
1. The teacher responds rather curtly, “Then if you think you’re supposed to get something out of the video then you’re missing the whole point of the video”.
2. “But I’m not supposed to look at this and think ‘ya, school is bad’?”
1. The teacher asks, “What are you supposed to do?”
2. “You know there’s a whole reason behind the music video. They’re trying to deliver some sort of message.”
1. “Which is?”
2. “That the old system is not working. They don’t like it. They want change.”
1. “Do they get it?”

2. "No."
1. "How do you know?"
2. "Because they're still doing the same thing. We're living proof."
1. "Do you think your thoughts are being controlled?"
2. "Yes."
1. "So, you're cool with the system?"
2. "No."
- "Getting up early in the morning, coming to school ... it's just like jail."
1. "But it suits you cause we've been doing it for the last 18 years."
2. "But it's no proof that it doesn't work."

The learners became increasingly engaged in the discussion and the focus shifted to aspects of their school life about which they would want to protest. The teacher-student-content interaction continued with the teacher guiding the discussion and the class engaging in a debate among themselves.

Student-content and student-student interactions around digital content also occurred in Lessons 3 and 4 as learners listened to and engaged with protest songs as part of their protest poetry activities. During Lesson 3, there was high student-content interaction engaging with the lyrics of the various songs in their booklets as well as watching the YouTube videos of the songs. They needed to familiarise themselves with the songs to decide which they wanted to study. On the following day, there was evidence of multiple modes of interaction. There was medium student-student interaction as three learners researched their poem together, and there was low teacher-student interaction as some learners sought the advice of the teacher to unpack the context and meaning of the songs. There was also medium to high student-content interaction involving the learners working on their own, and at the same time about three of them again used their devices to be on social media and to play online games. Table 5.29 is an extract from the lesson.

Table 5.29: Lesson 4: Continuation of songs of protest

Lesson 4: Continuation of songs of protest

Teacher 1; learners 2

1. The teacher asks who is doing which poem. She goes through the list of poems, and the boys raise their hands to indicate who is doing what.
- She tells them that they have 15 minutes to do research on their iPads or smartphones about their chosen poem. They have to get as much information as possible about the poems.

- After that time elapsed, they will get into groups; one person per poem per group. Each person will then share what they have learnt about the poem to the rest of the group.

After 15 minutes will have lapsed, they have to put away their devices.

1. The teacher asks, "What's the name of the website where they explain song lyrics?"
2. "Genius," replies one of the boys.
1. The teacher cautions that with these sites, it's other people like them writing down their views of the lyrics. She suggests that they have to be discerning.
2. One learner is visibly upset and mutters that the teacher does not trust their judgement.
- Another indicates that he has done his research at home.
- Most of the boys work individually; there's one group of three. They use their booklets, exam pads, smart phones and iPads.

The teacher sits on a desk in front of the class with her MacBook open.

One learner goes to her seeking clarification.

1. The teacher explains that these are protest songs so the singers are protesting about something. This means the first thing they have to research is what they are protesting about.
2. Another learner approaches her seeking clarification.
- One learner asks, "Who are the aboriginal people?"
- Another responds, "The indigenous people of Australia".
- One of the boys from the group remarks that the song *This is America* is not really clear.
1. The teacher suggests that they watch the video as it would explain better.
2. Another learner suggests they look at YouTube videos to get more explanations.
- Two other learners approach the teacher for clarifications.
1. The teacher uses her laptop, then says for the song *Beds are Burning*, they need to use Google to find out the context of the poem and do some research about Australia.
2. One complains that there are too many hidden meanings
1. The teacher tells the boys that if they can't find information online, they can ask her as she is a source of information as well.

The learners who chose the song *This is America* were interested in the layers of meaning and kept seeking clarifications as they did more research and delved deeper into the song.

In Lessons 6 and 7, to which I referred in section 5.3.2.2, learners did two online quizzes. The first tested their knowledge of the protest songs and poems they had studied and the second tested learning styles. This was evidence of high student-content interaction again using digital technologies as some of the learners seemed to enjoy doing the online quizzes. Another example of student-content interaction and teacher-student interaction, to which I referred in section 5.3.2.2, occurred during the Classcraft lesson. The teacher guided the learners in setting up Classcraft. The learners interacted with content during the setup. They were told to get into groups of between three and six persons. She projected the rules of the game from her MacBook onto the whiteboard. The boys logged on using their Google accounts. Marie demonstrated how

to create their profiles, and this was again projected. This was a lesson with no immediate pedagogical value; although there was high interaction between the students and content.

While most interactions revolved around the use of technology, there was one lesson that was free from any form of digital technology. It was an interactive, creative writing lesson where the teacher gave the learners different objects, characters and scenarios that they had to use create a story. This was a fast-paced lesson that took place in three stages, and every learner, except one, was engaged throughout the lesson. This is an example of high student-content interaction with the teacher providing the scenarios for the creation of the story. At the end of the final stage, the boys were given three minutes to do what was referred to as consciousness writing. They were told they had to keep writing for the entire period without stopping to think. This lesson confirmed the comment the teacher made during our interview that *“the lessons that have no technological interfaces in them where the learners themselves are not engaging with any kind of technology, are better lessons because that learner-teacher engagement does not exist as soon as you throw technology into the mix”*.

Another activity that did not involve the use of digital technologies but with seemingly no pedagogical value occurred during the ninth lesson. When learners arrived, the teacher took away their phones, and the focus of the lesson was on skills. The teacher commenced the English lesson by saying, *“We’re moving away from the traditional way of memorising stuff and writing about it”*. She further said, *“For the next couple of days, you’ll have to do stuff. Most of the stuff you do is content based. We’re moving away from content to skills.”*

She drew two columns on the whiteboard and wrote knowledge on the left and skills on the right. Learners were asked to name things that are skills and things that are knowledge. Some of the suggestions were changing a tyre and carpentry. They were then given an assignment to think of something that combines both a skill and knowledge to produce it. So, while the class activity involved high teacher-student interaction, the assignment required student-content interaction. However, the task was never discussed subsequently.

The final lesson was an example of the use of multiple modes of interaction and started with low teacher-student interaction as the teacher explained the assignment, which focused on

protesting an issue in their environment and thinking of creative solutions to that issue. There was also low teacher-student-content interaction as they discussed specific issues and possible ways of tackling them. After the discussions, there was medium student-content interaction as learners were given 30 minutes to work on the assignment.

In conclusion, high student-content interaction occurred most frequently in the English classroom, and it happened once with the use of digital technology. Teacher-student interactions were generally low and were mainly in the form of instructions from the teacher as she presented different tasks. Student-student and teacher-student-content interactions occurred at minimal levels.

The next section explores the enactment of the learning by design pedagogy in Marie's classroom.

5.3.3.4 Learning by design in the English classroom

The multimodal activities selected by the English teacher were generally based on learners' interests, their lived experiences and what was relevant in their lifeworlds. Firstly, the decision to use protest songs that included reggae, folk and hip-hop was a way of providing a diversity of genres that would appeal to a diverse group of learners. Although learners were given the written texts in their booklets, they all chose to engage with the YouTube videos of the songs and selected the poems based on their music preference. Additionally, their introduction to protest poems was through the song *Another Brick in the Wall*, which they also watched on YouTube.

In our interview, Marie emphasised the importance of freedom of choice and relevance of content. As such, learners' agency and diversity were valued in the English classroom, and this enhanced their experience of poetry. Marie's pedagogical beliefs and practices reflect the value of the process of experiencing.

The lesson was also an example of learners analysing critically as they discussed their right to 'walk on the grass', which was only accorded the older Grade 12 boys. They also debated the choice of first additional language and the benefits of learning a foreign language. The extract in Table 5.30 includes part of the discussion.

Table 5.30: Lesson 2: Protests

Lesson 2: Protests <i>Teacher 1; Learners 2</i> 1. The teacher reminds the boys of their previous group activity where they needed to find an aspect of school life they want to protest about. 2. One boy says that he doesn't think that Afrikaans and Zulu should be the only thing they should be learning. 1. The teacher suggests walking on the grass since only the matrices are allowed to walk on the grass. 2. Some of the boys disagree that walking on the grass is problem. - One says that there has to be a hierarchy. - One adds, "How does everyone gain respect if we give everyone the same rights?" - "If you're going to give us a first additional language, give us more languages like Spanish." 1. "But that is not a national language." 2. "Well, I don't plan to stay in SA." 1. "What about other African languages?" 2. One asks, "Would you go to Spain and expect to learn Zulu?" <i>An argument ensues about the benefits of learning a foreign language, some of which I can't decipher, followed by another discussion about the merits and disadvantages of the school system.</i>

Another example of experiencing the known, and hence, situated practice, in the classroom was the use of *Classcraft*, to which I refer in section 5.3.3.2. Given that this was a class of boys, some of whom frequently played video games, the teacher chose *Classcraft* as a way of dealing with the issue of classroom discipline. However, the level of pedagogical value of this activity is questionable.

There were very few examples of conceptualising with perhaps the most obvious examples being the online quizzes. The first one tested learners' knowledge of the various protest songs they had studied and the others focused on evaluating their learning styles.

The task that was given to learners during Lesson 6, to which I refer in section 5.3.2.2, required learners to create a piece of protest art or writing, a song, a poem, a poster or a piece of graffiti, to protest a current problem in society, which required them to apply critically and creatively, the knowledge learnt about protest poetry. More than half of the class had not submitted their assignment when it was due, and hence, during Lesson 11, the final lesson observed, the teacher revisited the activity and added other tasks. Table 5.31 is an extract from the first part of the lesson.

Table 5.31: Lesson 11a: Protest task

Lesson 11a: Protest task <i>Teacher 1; learners 2</i> 1. The teacher gives each learner a handout and tells the class that the teachers in the other English classes have given the children a lot more stuff to do and so they have a lot more marks. - She tells them to put their phones and iPads away and to read what's in front of them. She then says it's not going to make any sense. - She says that the task is to put together a proposal about something you will protest about and how you will go about protesting. 2. One learner remarks, "Ma'am but we've already done this with our protest songs?" 1. "You can use that." - "So, half of the thinking for that you've already done ..." - "So, all that you do now, that idea that you have, if you were to translate into action, how would you do it?" - "So, if you were going to put up posters, what would you need to do to put up posters?" - "If you were going to speak in assembly, what would you need to do in order to do that?" - "So, the third slide of the task that you've done around protest poetry, should have related to your own protest song, or poster or banner ... So, you may have already done that. (yah) If you want to take that, what were some of the things that you guys were protesting about?" 2. The boys all give their ideas, which aren't quite audible. 1. The teacher continues, "Is there something that needs to be changed within our environment here? And we feel like there's something wrong and that wrong needs to be righted. If that's not the case ... then you're going say why do you think that it's still necessary for us at this school to be aware of it." - She mentions the terrorist attack in New Zealand and places that have entire assemblies dedicated to that.

Having realised that the boys have been distracted by technology throughout the lessons, Marie instructed them to put their devices away before explaining the activity. One learner remarked that they had already done a similar activity, and she explained that they could use the same task but extend it. This task required learners to take an issue from their lived experience and to think of creative solutions to solve their identified problem. So, along with the process of applying knowledge creatively and appropriately, this task was an example of experiencing the known as well as analysing critically, which can be observed in the extract in Table 5.32.

Table 5.32: Lesson 11b

Lesson 11b <i>Teacher 1; learners 2</i> 1. "So, you could say that we're at a school where you have top rated facilities, good coaches, we've got all of that kind of thing. How can we make some of that available to people who don't have that kind of thing?"

Observation: A few of the boys are participating in the discussion. The majority aren't engaging. Two are playing games and the teacher takes away their iPad.

2. One boy asks how he could deal with his topic, which was about the mistreatment of homeless people at the street corners.
1. There's lots of talking so the teacher says they need to listen.
 - "So, something like that is outside of this school. Why is it something that we need to have some awareness about? Why did you choose that?"
2. "Ma'am, 'cause they're still people ..."
1. "Do you think that there's something that people in this community need to do for those people?"
2. "Yes."
 - Another learner doesn't think there's anything wrong.
 - Someone mentions donations.
 - The learner objects and says donations is something you do out of goodwill.
1. The teacher adds that it's like a short-term temporary thing. So, what you're saying is that we need to look at those people as people and recognise their humanity and not be oblivious
 - "So how can you create some kind of protest action that would get people here. To notice those people?"

There's a discussion about what's wrong with the school, while some learners think nothing is wrong. They speak about pollution and issues such as recycling and single use plastics.

1. The teacher asks, "If that's the concern then what sort of protest, what kind of action would you take to address that concern? What kind of physical steps would you take to try and address that concern?"
2. "Social media."
1. The teacher says social media is one thing. "Do you think social media would get these guys here to change?"
2. No. They discuss several options
 - One boy suggests that protest might not be the right approach.
1. "Maybe a protest is not the way you're gonna go. When I say action, I want you to take the idea that you have, the thing that you feel needs to be change ... if you were to take your idea and say what would be the most appropriate action to get that idea to reach more people, what would you need to do?"

Issues such as homelessness, pollution and the problems in their school were raised. After a period of discussion, one of the learners suggested that protesting might not be the correct approach, which indicates a process of deep thought and analysis.

The creative writing task that occurred during Lesson 10 also necessitated the creative application of learners' knowledge about creative writing. In their application, they were encouraged to use multiple modes to represent the protest task.

Marie's pedagogical strategy, and in particular, the dominance of the knowledge process of experiencing, privileged learners' voices and lived experiences and suggested a desire to harness learners' epistemological diversity and agency in the English classroom. This was evidenced in

the use of a diversity of modes and activities as well as genres of music to suit learners' tastes. The use of music as a form of poetry, allowing learners to choose their poem, as well as how they wanted to represent their protest and which application (PowerPoint or slides) to use, all demonstrate that learners' diversity and interests were highly valued in Marie's classroom. The appreciation of learner diversity and agency was confirmed in the following statement: *"One of the things I did was to move away from the system of prescribing one text, teaching a single text, and I moved more towards a system of allowing more freedom of choice for the learners"*. She added, *"What is relevant to one person is not going to be relevant to another ... It's more an idea that you must choose what is relevant to you. You must find relevance in the things that are around you and in order to do that. You have to approach it from your perspective"*. Marie's views reflect a situated approach to learning by providing learners with authentic learning experiences. However, this was not balanced with the use of other knowledge processes, which were minimal. Nevertheless, although Marie's pedagogical strategy was less traditional and seemed more facilitative, poor class control and frequent distractions from the various technologies diminished the pedagogical value of the lessons. Consequently, tasks were rarely completed by all learners, and there was no follow-up to ensure that they were. The distractions, however, confirmed Marie's comment in our interview that *"the phones are an obstacle in the classroom"* as well as Alice's comments that learners were usually off-task with technology. Additionally, many of the activities, like the learning styles quizzes and the Classcraft activity, though harnessing the affordances of digital technologies, seemed to lack pedagogical value.

5.3.4 Teachers' Perceptions of the 21st Century Classroom

In expressing his vision of the 21st century classroom, the principal Rupert framed it in terms of the school's 'Capex' plan to extend and build more classrooms as the College was growing. This was in line with the IT Director's statement that the school had invested R5 million to improve its IT infrastructure as a way of boosting technology integration.

In terms of his vision for the further integration of digital technologies, Rupert the principal, expressed a keen interest in online learning, where *"ultimately every boy does some sort of online course"*. Learners will however have to conduct research and identify the course and get a

certificate. The main purpose of this will be *“to create lifelong learners in them with the technology that is going to be a way they can continue learning or beyond university”*. However, he emphasised that online learning *“all has its place, but ultimately the one-on-one relationship is still a very critical one”*. He added, *“I want them to know that actually it is quite a good idea to have the face-to-face contact with their lecturers”*

The principal added that they were also focusing on skills that he called *“the critical sort of linking of ideas, being able to make connections, being able to think around an issue [and] ... find solutions, different solutions, creative solutions”*. Rupert further expressed the view that human relationships are extremely important, stressing that *“the ability to interact with people, to listen, to really listen as opposed to not listen to an answer but listen to”* are crucial.

In articulating her view of the 21st century classroom, Marie, the English teacher, posed the question, *“A more crucial part of 21st century education is actually saying that in the 21st century, if we’re looking ahead, which is what we’re supposed to be doing as teachers, what are we looking ahead to?”* However, she lamented that this is not happening. She therefore suggested that the term ‘21st century education’ needed a better definition. She remarked that many teachers had the tendency to equate 21st century education with technology and posited that *“technology should be one of many possible tools that you have in your toolbox and it’s not the go-to tool”*.

Alice, the History teacher, highlighted three crucial 21st century skills. Like Rupert, she felt that creativity as it relates to problem-solving is an essential skill. Linked to this is the need for learners to be adaptable, as she viewed adaptability as a vital 21st century skill given the fact that the job market was an unknown. A similar view was articulated by Marie, who stated that resilience along with being open to failure is important. She postulated that teachers needed to *“find ways to put them [learners] in situations where they are allowed to fail safely: that didn’t work, why didn’t that work”*; in other words, *“trying something new, seeing that it didn’t entirely work and understanding why it didn’t work”*. A similar view was shared by the principal who highlighted the need for *“bouncability”* and flexibility in learners. He remarked that learners in the 21st century must not be afraid to fail and get back up.

Alice added that critical literacy is also an important skill for learners to have because learners who live in an age where they are *“bombarded with information”* must be able to *“access the information responsibly... be able to analyse the information and understand the source, the problems, the reliability, the bias”*. For Marie, critical thinking is a vital skill, and it can be achieved by using *“a system of generating questions instead of providing answers”*, which in turn *“puts the agency back on the learners”*. What this does, she added, is that it takes the focus away from the answer and forces learners to ask the questions they have about *“a particular thing”*. Questions such as *“Why is it here?, Where did it come from? How does it work?”* will increase their curiosity. This will help them create their own critical framework. This view expresses the knowledge process of analysing functionally that is part of the learning by design framework.

According to both Alice and Marie, collaboration is a less important 21st century skill. Alice averred that *“collaboration seems to be an important skill but not an important skill with the sort of the move towards a more technological environment, collaboration seems to be less of an important skill”*. However, planning collaborative activities requires a lot of time and planning and must be well-managed. She noted that she did not have the time to prepare adequately to facilitate this type of learning experience. Likewise, Marie was ambivalent about whether collaboration is an essential skill in the 21st century. She started by saying that it is crucial but the way it was being taught does not promote collaboration. She made a clear distinction between collaboration and group work, stating that *“real collaboration would be a project that isn’t an English project but a school project where you’ve got to go and collaborate with other departments”*. She then expressed her frustration that teachers themselves do not collaborate and asked, *“If teacher collaboration is not happening, then how is learner collaboration even going to happen?”* Having said all of that, she wondered *“how much of a 21st century skill collaboration is in the whole scheme of things [and] how much of a role it needs to play in a 21st century environment”* given the focus on transferable skills. She suggested that perhaps it is one of those skills that happens inadvertently. This echoed the principal’s sentiment that some skills should be *“caught rather than taught”*.

5.4 HAMPTON HIGH SCHOOL

5.4.1 Context

On the first day of classroom observations, I arrive at the reception of Hampton High School around 10:45 a.m. and wait to be met by the History teacher. I am scheduled to observe a History lesson, but I have not yet received a timetable, and so I am not sure what time the lesson is going to start. The History teacher too was unsure of the exact time of the lesson since the timetable is organised in cycles, and as such, lessons commence at different times each day depending on whether there is an assembly, a cycle test or an entrepreneurial day. Generally, the decision around the starting times for lessons is made by the principal and the school administration, and the time is only communicated to teachers at the end of the day or on the morning of classes. I am eventually met by Stacey, the History teacher, who escorts me to her beautifully decorated classroom in an old shipping container. The learners arrive slightly late and stand in two rows along the corridor with males in one row and females in another. Stacey, greets them, calls their names and places them at specially assigned tables, each marked with differently coloured stickers. They sit in groups according to their previous term's marks. When everyone is seated, the teacher starts the lesson.

Hampton High School is a government school and a former Model C school in the northern suburbs of Johannesburg. It is in a well-developed, affluent part of the city but has a diverse learner population. According to the History teacher, *“Our demographic is so widespread that we have really poor, really rich, we have really technological, we have really book smart”*. At the time of observations, the school had a student population of approximately 1 000 learners and 65 academic staff.

Data collection included interviews with George, who has been the principal at the school for just over six years and Paul, the deputy principal and Head of IT who had taught at the school for 25 years and had witnessed various changes at the school. I also interviewed Palesa, the Grade 9 English teacher, and observed lessons in one of her Grade 9 classes, and I interviewed Stacey, the History teacher, and observed the History lessons of the same Grade 9 group of learners.

One of the most significant changes that had taken place within the school is the investments in improving the school's IT infrastructure. This was mentioned by both the principal and deputy principal.

5.4.2 Digital Technologies at Hampton High School

The trajectory of Hampton High School's adoption of digital technologies started with the installation of smartboards in some classrooms. According to Paul, *"About 10 years ago we put in some interactive boards ... smart boards, and it wasn't entirely a success, maybe because the teachers didn't use them to their full potential"*. He explained that the smartboards were mainly used as a white screen and that other features like the touch technology were not used. He added that *"once they came to the end of their lives, we took them out"*. In addition, he stated that there was *"a pilot project about 6 to 7 years ago with iPads. We bought 30 iPads and we had a classroom where the teachers could book out that classroom"*. The iPad project was abandoned as it was unsuccessful. The personal nature of the technology makes sharing devices difficult, and it did not work as *"you need one device per person"*.

The DBE, as part of their e-education strategy, had supplied a number of schools with tablets. George, the principal, confirmed that his school had received 40 tablets three years prior, but the school no longer had these devices because the department *"took it back within a year. They redeployed them"*. He expressed the view that the Government's IT rollout *"to be very honest and brutally honest is not working with schools like ours"*. The school therefore invested in their own devices and provided teachers with laptops.

A previous barrier to the uptake of digital technologies at Hampton High was the unreliability of the internet. The problem had been recently solved with a further improvement of the digital infrastructure in the form of fast and reliable internet, which meant that there was continuous access to Wi-Fi for teachers and learners. Data projectors were installed in classrooms, and according to Paul, 80–90% of classrooms have been fitted with them. He further highlighted that Vumatel, a fibre network provider, had built a point of presence on the school property:

The school gets 1 G of free internet so teachers and learners can connect at the same time I think four-five years ago there was always a problem when we had unreliable internet to be able to offer quality services to the kids and to the teachers. But once we got that, the fibre internet is very reliable. It hardly ever goes down. It's always on, always fast so we have good Wi-Fi.

Another significant change in terms of access to digital technologies was partnering with Microsoft to be able to use Office 365, and in particular, Microsoft Teams, as a dedicated platform for the school. Because Hampton High is a public school, they get free Office 365 subscriptions for learners and teachers with the full Office Suite. Paul added,

They can download Microsoft Office on five devices. And then obviously we use Microsoft Teams ... So, the teachers can form groups or teams, and they can invite their students to that and they can share documents and things like that using Microsoft Teams. We've only started using Teams in the last year, year and a half or so but we've had Office 365 for about three or four years now. I think that was a massive change in getting everyone on board in terms of the technology and accepting the change with technology.

With regard to the current adoption of digital technologies, the principal stated that the school has started to use a lot more technology, in particular WhatsApp, Facebook and their website, which all play functional roles in the school. These are used “not only for learning but also for marketing the school. So that kind of technology is over the 6 years have grown phenomenally”. George added the following:

We're using the programme called, am, what's it now called? Groups. So, a lot of teaching is happening off campus. [Seeing that he was having difficulty remembering the name of the platform, I asked, “Microsoft Teams?”] Yes, Teams. So, a lot of teaching is actually happening like that and that is a huge change. The older teachers are still holding on ... but the young, modern teachers are certainly well equipped to teach very well.

Paul added that both teachers and learners have responded well to Microsoft Teams despite his initial misgivings. In our interview he said,

I was a bit concerned at the beginning that the take-up wouldn't be that big, but I've been surprised. I think it's been really well taken up. A lot of teachers are using it. Generally, we find the younger teachers seem to take it up more quickly and are more eager to learn to do it.

Paul also shared the view of the principal that the older teachers are more reluctant to use digital technologies since *"the older teachers who have been here for many years tend to be a bit more scared of technology. They require a bit more training, a bit more hands-on training to get them on to it"*. However, during our interview, Palesa, the English teacher, stated that *"using Microsoft Teams doesn't always work for every subject"*. She felt that it was *"your normal platform"* and it was not interactive. The History teacher also indicated that she had not used Microsoft Teams much *"because I feel that it puts the kids that don't have access to the internet at a disadvantage"*. The views of these two young teachers contradicted those held by the principal and the deputy principal in his role as head of IT, who firmly believed that teachers, particularly those who are younger, are using Microsoft Teams.

Regarding learners, Paul mentioned that although there are learners who do not have access to the internet at home, they can use the school's facilities after school. He stated,

I think there's been a good response from them, a good take-up. I'm using it in my class as well. It works pretty well. On that note of no internet at home, it is an issue. But we do make available, obviously we have the internet here. We have computers available in the afternoons here. So, after school in the media centre there's computers and there's also in the computer room. The students, if they need to do any work online, before they go home, they can go there, and if they don't have internet at home.

The school has a BYOD policy for the use of digital technologies by learners, and according to Paul,

Now we have a policy of bring your own device. They kids bring their phones, they can bring their laptops, they can bring their tablets or whatever they want, and they can securely connect to our network, and then they can have access to the internet and obviously then collaborate with their teachers".

The principal confirmed that *“if you want to bring a tablet to school, if you can’t afford it, we still do the textbook. In our school you can do both”*.

According to Paul, computer literacy training in Microsoft Office 365 was offered to the Grade 8 and 9 learners. Paul specified that this involved *“how to log in to your account, how to check your email, how to log into Teams”*. Learners have also been introduced to coding. He further stated that this is one lesson per week in the junior grades. However, although Paul indicated that learners were provided with opportunities to learn about digital technologies, this was disputed by the History who stated,

there’s lots of kids that grow up not having access to tablets, computers and don’t know how to use them. I mean we see it when we’re doing projects and they have to type it up.

The kids don’t know how to do the layout cause there’s no computer lessons for kids.

She added, *“it’s basically like coding as far as I understand. It’s not really like how to type and how to use word or powerpoint or any of those things”*.

Learners from Grade 10 have the option to choose either Computer Application Technology (CAT) or IT as a subject for the National Senior Certificate Examination. The school also offers Engineering and Graphic Design, for which there is a 3D printer. The school has two computer laboratories where these classes are held.

Hampton High School can be classed as a privileged, technology-rich government school, which is not the norm for many South African public schools. Computer literacy classes offered to learners in the junior grades suggest opportunities to learn *about* technology although this seems to focus mainly on coding and how to access emails and Microsoft Teams.

The next section looks at the appropriation of digital technologies in the Grade 9 History and English classrooms.

5.4.2.1 Appropriation of digital technologies in the History classroom

The History classroom was equipped with a data projector, two speakers, a white board as well as a small pulldown white screen. The teacher either used her personal MacBook or the Dell

laptop that was provided by the school. She generally accessed notes from her MacBook and used the school assigned laptop to show History documentaries from You Tube.

Stacey indicated that apart from showing videos, she projected her lesson notes and PowerPoint slides. However, during observations, Stacey mainly used her laptop and data projector to stream YouTube history documentaries. This was done during three of the six lessons observed. Learners had been studying the events that occurred towards the end of World War II with the dropping of the atom bomb on Hiroshima and Nagasaki. During the second lesson, learners watched a YouTube video documentary that was streamed from the teacher's Dell laptop. It featured interviews with a few Japanese survivors and with two of the pilots who had dropped the bombs. Table 5.33 is an extract from the lesson.

Table 5.33: Lesson 2: YouTube documentary on the bombing of Hiroshima

Lesson 2: YouTube documentary on the bombing of Hiroshima

Teacher 1; learners 2

1. The teacher goes to her laptop and puts on a YouTube documentary featuring harrowing accounts from Hiroshima survivors.
- She tells the learners to pay attention to where the people are.

The video is projected onto the small drop-down screen.

1. The teacher starts the video. After about a minute, it starts to buffer and pauses.
2. Learners watch attentively without commenting.
1. In the meantime, the teacher draws two columns on the board in preparation for the next part of the lesson.

Two American fighter pilots responsible for the bombing were also interviewed.

1. She pauses the video briefly, then makes a brief comment about what the pilots said.
- She adds that just as the soldiers in Nazi Germany had no choice, these American fighter pilots were not to blame.
- She resumes the video, and it ends after 10 minutes.

After watching the video, the class engaged in a debate about whether America was justified in dropping the bombs.

The teacher was able to present this multimodal lesson because of the pervasive Wi-Fi in the school and the accessibility of content from the internet. She used the technological capabilities of her laptop and the data projector to harness the affordances of multimodality, accessibility and immediacy to stream the YouTube videos, enhancing the lesson.

Watching the YouTube video can be seen as the representative use of technology, and the use of the video content to supplement the information in the textbook about the dropping of the atom

bombs can be viewed as a generative activity as learners can debate whether America was justified in dropping the atom bombs on Japan. This is discussed further in section 5.4.3.

During the third lesson, the teacher showed two short videos from the Smithsonian YouTube channel that focuses on the Japanese internment camps in America and the Japanese concentration camps. At the end of the videos, the teacher recommended that learners watch the film, which is based on the actual experience of the prisoner of war who was interviewed in the documentary, at home. However, there was no further discussion of the content of the documentary. Table 5.34 is an excerpt from the third lesson.

Table 5.34: Lesson 3: End of World War II—Japanese internment camps

Lesson 3: End of World War II—Japanese internment camps <i>Teacher 1; learners 2</i> 1. The teacher tells the learners that they will be watching short videos on the Japanese internment camps and the prisoner of wars. - She sets up her laptop, and the videos from the Smithsonian Channel are projected onto the small drop-down screen. <i>The first video clip is set in San Francisco in 1942. It shows a Japanese family leaving home and not going of their own free will.</i> 2. The learners watch quietly. There is no discussion. <i>The second video, also streamed from the Smithsonian channel, is about Japanese concentration camps and shows an interview with a prisoner of war.</i> 1. After the videos, the teacher asks, “Does that make better sense to you?” - She then recommends that they watch the movie <i>Unbroken</i> based on the actual story about the prisoner of war who was being interviewed in one of the video clips.

The accessibility of content on YouTube was again harnessed to present a multimodal lesson and give learners authentic information about the Japanese internment camps.

During Lesson 5 in which the topic had changed to the space race and the arms race, the learners watched a 5 minute video about the space race. Again, there was no discussion about the content of the video except that the teacher once again suggested that learners watched a longer YouTube video at home. Earlier in Lesson 5, the teacher streamed a music video from YouTube as learners were doing a comprehension based on a song by the Sting called *Russians*, which criticises the Cold War policy of mutually assured destruction. The immediacy and accessibility afforded by the Wi-Fi and the available technologies made it possible for the teacher to

immediately stream the music video to make the learning richer and more authentic as learners were able to have a different experience while the song was being played.

During our interview, Stacey remarked that she would be keen to integrate more digital technologies in her teaching but is cognisant of the fact that a number of learners did not have access to smart devices to connect to the internet outside of school. It was also for this reason that she was reticent about using Microsoft Teams, which is available to teachers and learners. She said the following in the interview:

I would love to but especially working at a government school and the different demographics that we have of the kids. It's difficult cause not all the kids have access to internet connections at home or to even stable electricity. So, it's a challenge with them having to charge their devices and stuff.

Yet, during our interview, the Head of IT stated that all learners have access to computers and the internet in the library and as such had access to these technologies after school. Additionally, on two occasions, Stacey recommended that learners watched other YouTube documentaries outside of class, suggesting that there was some awareness that they had access to digital technologies outside of the classroom.

In summary, Stacey was able to harness the affordances of multimodality, accessibility and immediacy of the school's ubiquitous Wi-Fi and her other digital devices to access YouTube documentaries and a music video. However, her use of such technologies could mainly be described as representative and focused on learning from technology.

The next section examines the English teacher's appropriation of digital technologies.

5.4.2.2 Appropriation of digital technologies in the English classroom

Technology takes away from the classroom experience ... And it also takes the experience of being able to engage with text, cause now when we were in school it was about the text, you feel the paper, you're basically engaging with what you're reading.

This is Palesa's, the English teacher, view on the use of digital technologies. She was concerned that *"it basically makes me very redundant. They just want to copy off the board, they just want*

to focus on the board instead of focusing on what I'm saying before I get to the board". Palesa's beliefs about the use of digital technologies indicate an inability to perceive the affordances of digital technologies and insufficient teacher learning about how she could use these affordances to provide rich learning experiences for students.

So, despite the English classroom being equipped with a data projector and the teacher having two laptops, one provided by the school and a personal laptop, digital technologies were used mainly to google a word for film study and to project summaries prepared in PowerPoint slides. In the 10 lessons observed, digital devices were used in five lessons, and in two of these, learners were allowed to use their cell phones as part of the school's BYOD policy to quickly google the meaning of a term. Palesa explained that learners were allowed to use technology in her lessons:

Basically, for English, go and google, check the definition of a word. The reason why? When it's quicker or faster for them just to check the definition. I'd prefer them to use just Google as opposed to stand up, go and get a dictionary from my cupboard, sit down.

Table 5.35 shows extracts from the lessons when learners used their cell phones to google information.

Table 5.35: Lesson 3: Literature text—No. 1 Ladies Detective Agency

Lesson 3: Literature Text—No. 1 Ladies Detective Agency <i>Teacher 1; learners 2</i> <i>They go through each question like before and the learners give their answers and correct in their books. There's a reference to a bluechip company in one of the answers.</i> 1. A learner asks what it is. 2. The teacher says, "Get out your phones and google it. There's Wi-Fi. It's fixed." 1. A learner checks the definition and states, "Bluechips sells high quality." - The teacher asks the learners to name a high quality brand. 2. A learner says, "Adidas". Lesson 8: Praise poetry <i>(The teacher asks)</i> 1. "Do you know what a sonnet is?" 2. No response from learners. 1. She then refers to a Shakespearean sonnet, gives them the first line, "Let me not to the marriage of true minds ..." and asks them to find it on Google; then read the first four lines. 2. The learners do a search on their cell phones. - One learner reads the poem

- Another learner points out that it is Sonnet 116.

Later in the same lesson.

1. The teacher asks, "Does anybody know what the Akan are?" She says, "Get your Google out. What tribe are the Akan?"
2. Some learners check their phones. One learner reads what she has found to the class.
1. The teacher reads the first stanza; then they explore the meaning.
- She reads the second stanza, then asks the learners to check Google again for 'O Suadomo'.

The learners using smartphones are examples of Google being used to replicate the function of the dictionary with no change to the task. The nonlinearity of the internet, which would have afforded deeper exploration of the word 'Akan' or the concept of a 'bluechip' company, was not harnessed.

In addition to using their cell phones to google words in class, learners were permitted to use their devices to listen to music while they worked on their descriptive and narrative essays. This occurred during the fifth lesson.

The teacher used her laptop and projector to project chapter summaries of the literature text being studied. Learners spent the entire fourth lesson quietly copying the summaries that Palesa had prepared in PowerPoint while she did her 'admin'. They should have continued copying the summaries during Lesson 5, but since the date for their cycle tests had been brought forward, Palesa said that she would give them copies of the remaining slides as they needed to move on to another activity. The technological affordances of the available technologies were used in a mainly passive activity.

Additionally, the teacher used her laptop and the data projector to show the film *Strictly Ballroom*, which was being viewed for film study. In our interview Palesa remarked, "*I do use the projector as often as possible. So, it basically depends on the sections we're doing, so if it's visual things like visual literacy, advertising, film techniques and study, that's where I use the projector*".

She also mentioned that she used the projector to project class notes onto the screen and "*so in terms of film study, comparison. To show comparison of a particular shot or a particular angle*".

However, learners watched the film passively after being told by the teacher, "*Be warned! This is definitely in Paper 2. Watch and watch carefully*". She again used the opportunity to mark assessments. Learners were all engrossed in the film and shouted their disapproval when the bell

ran to signal the end of the lesson. The movie was downloaded onto the teachers' laptop and projected onto the white screen. Palesa indicated that she preferred to download content because of the unreliability of the Wi-Fi, which was not observed. She stated, *"I download it because nine times out of 10, sometimes it drops me off. So basically, I'd rather download it and know that it's there and then I don't have to go on the internet. So, I basically source it from the internet"*.

Palesa's use of digital technologies demonstrates their representative use as they were only used as transmission or presentation tools. As such, their pedagogical affordances were not harnessed. One possible explanation could be the following statement by her: *"There's a beauty in writing and writing is now becoming very elementary. It's becoming secondary to technology"*. Her views indicate a fear that the essence of English teaching and learning will be lost with the increased use of digital technologies.

Although many forms of digital technologies were available at Hampton High School and they have continuous access to high-speed Wi-Fi as well as to Office 365 and Microsoft Teams, the History and English classrooms only provided opportunities for learners to learn from technologies, which were being used in their representative forms. This indicated a disparity between teachers' use of digital technologies in their classrooms and the expectations of the principal and deputy principal who believed that teachers were integrating technologies more into their lessons. Palesa's gave the following reason for not using Microsoft Teams:

It's like a platform basically [where] you can publish your school notes on there if a learner is absent. They can then go and get their school notes then they prescribe to that class' teams. They can only go on the Teams when they are in that class. My frustration is that if I do that, my learners don't listen in my class. Because they may rely on the fact that they can go back home and get it off Teams, whereas I need them to be present in class and they're present in class, then they're done, 20% of their studying is already done. Anything that I put on Teams, if ever I put it on Teams, is just for additional enrichment. It's not what I've obviously put in class. It's work, videos anything that they can refer to but it's not as interactive.

This statement again shows a great fear of being replaced by technology. It also indicates a lack of awareness of the affordances of Microsoft Teams, and particularly, insufficient teacher learning in its use. Consequently, Palesa only used digital technologies in a representative sense, harnessing the affordances of multimodality and accessibility to show a film, project PowerPoint notes and do an online dictionary search.

The next section explores the History and English teachers' pedagogical practices

5.4.3 Teachers' Pedagogical Practices at Hampton High School

5.4.3.1 Patterns of interaction in the History classroom

Chairs and tables in Stacey's classroom were mainly arranged in groups of four, and the ones at the outer ends of the classroom were arranged in single rows facing the chalkboard. To the left of the chalkboard was the white screen. The configuration of the chairs and tables remained the same throughout the observations, and although some learners sat in groups of four, there were no collaborative or group activities, and no student-student interaction was observed. Learners in this Grade 9 History classroom interacted around different types of texts, such as visual images, audiovisual material in the form of YouTube videos, and written texts mainly from the *Explore* textbook. These also formed the basis of interactions between the teacher and learners.

The first interaction between the teacher and learners revolved around learners setting their goals for History for the term. The teacher also distributed 'coffee cards' as a reward to learners who had achieved 80% and above at the end of the previous term. Stacey started by praising those who had performed well in the previous term and distributed the coffee cards to those learners who got an A. These cards allowed learners to get biscuits, tea/hot chocolate/coffee from the coffee station, which is set up at the far right of the classroom. Learners were then asked to write their goals for the current term, term 2, and to stick them on the white board. They were told that these needed to be different from the previous term's goals. The teacher asked one of the girls why she wanted to achieve above 80% to which she replied that she too wanted a coffee card. The action by the teacher of rewarding learners who had achieved excellent results in the previous term reflects a behaviourist approach to teaching and learning.

In her lessons, Stacey spent a lot of time explaining new concepts that pertained to the topics being covered during the period. Her strategy was usually to revise information previously taught, question and provide clarifications and explanations after learners were given an opportunity to respond. This was observed during the first lesson, whose extract is in Table 5.36.

Table 5.36: Lesson 1: World War II—the attack on Pearl Harbour

Lesson 1: World War II—the attack on Pearl Harbour <i>Teacher 1; learners 2</i> 1. The teacher tells the learners to open their textbooks to page 125. - She then recaps some of the previous term’s work; then says the reading is about the bombing of Pearl Harbour. - She asks, “Who knows where Pearl Harbour is?” <i>No response.</i> 1. She explains and then begins to read. - After reading for about a minute, she asks, “What is a superpower?” 2. A learner says a powerful country. - The teacher reads at intervals and stops to ask learners to explain key words and phrases. For example, she asks: “What does it mean to intern Japanese Americans? What did they do to them?” 1. A learner incorrectly refers to internships - Another learner says that they were removed from their homes and put into internment camps. 1. The teacher asks, “Why did they do that?” 2. “So that they can get information.” 1. The teacher asks, “What could America have done differently?” 2. “Used them to their advantage.” 1. The teacher asks, “How?” 2. “To gain information.” 1. The teacher clarifies, “To use as spies.” 2. “Deport them.” 1. Another says, “Have a contract agreement.” - The teacher clarifies, “Use as a double agent.” - The teacher reads and says that the Japanese Americans were used as Bayonet practice. She explains what a Bayonet is. - She reads again and explains.

During the second lesson about World War II and the bombing of Hiroshima and Nagasaki, the teacher used the same approach as in the first lesson. She streamed a documentary video from YouTube that provided a first-hand account of people’s experiences with the dropping of the bombs. Stacey remarked that the use of digital technologies, in particular, showing videos to younger learners, changes the way they interact in the classroom. She noted that “*for the*

younger grades when they see the videos, they can now visualise what I'm explaining. So, it's easier for them to visualise what we've already learnt". Table 5.37 is an extract from the lesson that demonstrates low student-content interaction with the documentary, which was preceded by low teacher-student interaction when the teacher spoke about the dropping of the atom bomb.

Table 5.37: Lesson 2: Documentary video

Lesson 2: Documentary video <i>Teacher 1; learners 2</i> 1. The teacher goes to her laptop and puts on a YouTube documentary with interviews with elderly Japanese citizens describing the US dropping of the atom bomb on Hiroshima. - She tells the learners to pay attention to where the people are. <i>The video is projected onto the small drop-down screen.</i> 1. The teacher starts the video. After about a minute, it starts to buffer and pauses. - While the learners are watching the documentary, the teacher draws two columns on the board in preparation for the next part of the lesson. <i>Two American fighter pilots responsible for the bombing were also interviewed.</i> 1. The teacher pauses the video briefly, then says that for the two fighter pilots one said that he was given a task to do and he did it, while the other said that as soon as they dropped the bombs, he realised the damage it was going to cause. - She adds that just as the soldiers in Nazi Germany had no choice, these American fighter pilots were not to blame. <i>The video ends after about 10 minutes</i>

After watching the video, the class engaged in a lengthy debate about whether America was justified in dropping the bombs. This was an example of medium teacher-student-content interaction that involved the teacher and learners using the information from their textbook and the video to discuss the issue.

In Lessons 3 there was high teacher-student interaction and low student-content interaction. The lesson started with learners briefly watching two YouTube videos streamed from the Smithsonian channel about Japanese internment camps and prisoners of war. After a brief comment and recommending that learners watched a movie about the experience of a prisoner of war at home, Stacey moved on to the next activity, which was reviewing capitalism and communism in preparation for the next topic focusing on the Cold War. The discussion centred on revising definitions with Stacey asking questions like "*What is communism?*" and "*What is capitalism?*" while learners made notes. In Lesson 4, there was high teacher-student interaction as Stacey first

reviewed the work covered so far during the term before discussing issues relating to the Cold War using the textbook and a handout that was provided to learners. Table 5.38 is an extract from the lesson.

Table 5.38: Lesson 4: Cold War

Lesson 4: Cold War <i>Teacher 1; learners 2</i> 1. Prior to the learners' arrival, the teacher places a handout she had prepared on their desks. - The teacher tells learners to take out their textbooks and turn to page 137. They are told that they need three pens, a red, a blue and any other colour. - She reminds learners of the topics covered so far: the end of World War II; the Japanese bombing of Pearl Harbour; the US bombing of Hiroshima and Nagasaki; and the ideologies of communism and capitalism. - She states that they will be starting the Cold War. 2. Learners use both their textbook and the handout for this class activity. 1. The teacher begins by outlining the competition between the US and Russia and mentions that Russia had begun to develop nuclear technology. - She then advises learners against asking 'what if' questions, saying that it would be pointless to have such discussions. - She continues to discuss the different spheres of influence and speaks about Russia providing money and military support for those countries that supported their ideology. 2. One learner started to pose the question about Russia possibly supplying ammunition to South Africa. 1. The teacher says she knows what he's trying to ask and that she'll come to that later. - She describes the idea of mutually assured destruction; then begins to read from the textbook.

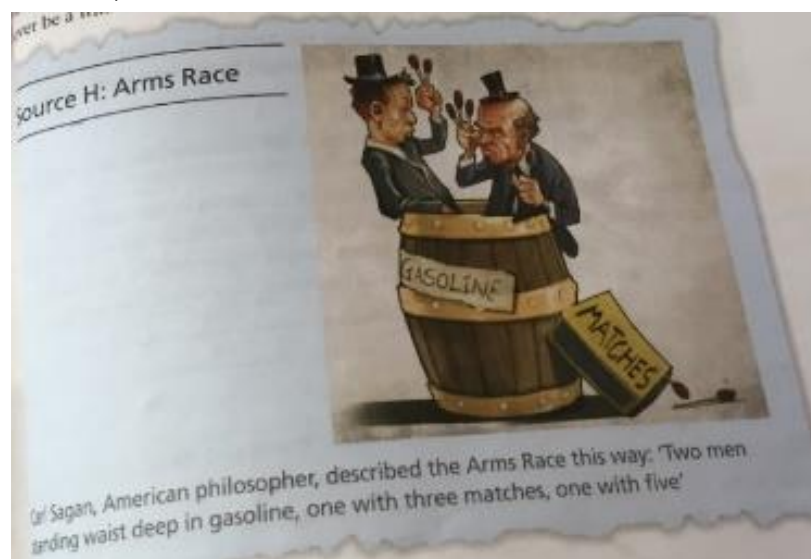
In the extract in Table 5.38, it is apparent that the teacher wanted to conduct the lesson with minimal interruptions, and as such advised learners against starting any *"pointless"* discussions, thus curtailing learner engagement. Having completed the work planned for the lesson, learners were allowed to briefly make notes. After this period of low student-content interaction, the teacher continued to present information on the iron curtain, the space race and the arms race while learners made notes.

Lesson 5 was a multimodal lesson and an example of high teacher-student-content interaction, where the teacher and learners jointly did a source analysis of an image and a song exploring mutually assured destruction. Both texts were found in the textbook. Learners also watched the music video of a song that was streamed from YouTube as well as a short video about the space race, both examples of low student-content interaction. The extract in Table 5.39 shows the interaction that took place during the lesson.

Table 5.39: Lesson 5: Source analysis

Lesson 5: Source analysis

Teacher 1; learners 2



Text 1

1. The teacher begins to read about the arms race and about its importance in the Cold War.
 - She then asks the learners to analyse the image on Source H. She says, "Tell me what's happening".
2. A learner says, "They both have the power to explode while lighting a match".
 - Another says, "They're using gasoline to bomb themselves."
1. The teacher asks, "are they only bombing themselves?"
2. A learner responds, "They are going to ruin themselves and the other person as well".
1. The teacher then asks, "Does it matter how many matches they're holding?" And adds, "It doesn't matter the number of matches and who lights first as they will all be destroyed".

The second discussion was based on the song *Russians* by Sting. Learners were excited to see the music video and they began to sing along.

Lesson 6 was an example of high student-content interaction as learners spent the entire lesson summarising content from their worksheets and completing the comprehension questions from the previous lesson.

Given the volume of content to be covered during the short period of time to ensure that learners were prepared adequately for their upcoming assessments, the teacher spent a lot of time presenting information and reviewing content that was previously taught. Hence, the dominant mode of interaction was teacher-student, which largely occurred at a high level. Teacher-student-content interaction occurred less frequently but at a high or medium level. While there were a few opportunities for learners to interact with content, usually by watching YouTube

videos, these generally occurred at a low level as the time spent on these tasks was very short. There were no opportunities for learners to work together in groups, hence there were no examples of student-student interaction.

5.4.3.2 *Learning by design in the History classroom*

During the three weeks of observation, the main knowledge process used by Stacey was conceptualising by naming. The knowledge process of analysing was used occasionally and applying and experiencing were used rarely. In our interview, she stated that the ability to debate and justify one's point of view are crucial aspects of critical thinking.

During the second part of the first lesson, the process of conceptualising by naming was used to discuss terms like superpower, internment, and bayonet practice. And in the second lesson, the teacher described what an atom bomb was and gave a lengthy explanation about the dropping of the atom bomb on Hiroshima and Nagasaki, after which she explained what was controversial about America's actions. This period of conceptualising involved minimal learner comment. Learners then watched a documentary video with interviews with the survivors of the bombing to get the experience of what it was like for the survivors. This brief process of experiencing was followed by analysing critically as the class debated the question "Was America justified in dropping the bombs?" The use of the knowledge process of analysing confirmed Stacey's comment that it was important for learners to "*formulate their own opinion or justify their point of view*" as an aspect of critical thinking. Table 5.40 is an extract from the debate that took place during the lesson.

Table 5.40: Lesson 2: Debate

Lesson 2: Debate

Teacher 1; learners 2

2. One learner suggests that Japan went to America without giving them a signal to tell them ... how powerful they were militarily.
1. The teacher summarises and says, "You reckon that because of the surprise attack on Pearl Harbour, the Americans had every right to do it. Cool."
2. "Not every right ma'am."
1. The teacher says, "That's fine, that's fine" and moves on to another learner while writing 'Surprise attack at Pearl Harbour' on the board.

2. Another learner says, "I disagree because they did a lot worse to Japan".
1. The teacher asks, "Who they?"
2. "America did worse to Japan than what Japan did to them and it wasn't very good for them to just attack random people who didn't have anything to do with."
1. The teacher asks, "So, what do you want me to write here?"
2. "America did worse to Japan."
1. "What do you mean 'they did worse to Japan'?"
2. "They did a lot more damage and like they didn't, they ruined a lot more of Japan. They killed a lot more people."
1. "Then what? Cause we're looking at Japan. Japan has gone into China, Taiwan, all the Indonesian states. The teacher lists Japan's atrocities, then remarks, "So, you're ignoring everything else that the Japanese have done?"
2. "Well America is not doing it for everyone else."
1. "But they are because the World War is supposed to be coming to an end, then Japan went and re-launched the attacks on the Pacific. So, I'll accept your point, but I need you to re-word it. So just think about how you want me to write it on the board."
2. "Ma'am, so basically they ..."
1. The teacher says, "No using they", and asks, "Who is they?"
2. "Okay America started the thing ..."
- Another learner says, "Nuclear war".
- "Never mind."
1. The teacher replies, "Not never mind."
2. So America started. Japan was not gonna go and let them stop the war 'cause they really did a lot of damage ma'am."
1. "Who?"
2. "America. I think I know the story."
3. The teacher retorts, "I think you've been listening to Biology while I've been talking History. Cause that made no sense."
- "So, let's think about the facts that we just learnt. Look at your words in your books there! Look at the facts. Give me the facts."

Learners check in their books.

2. "I agree that they were justified cause Japan was given the choice to surrender but they chose not to."
1. "Stunning! I agree with you." She makes a note on the board. "What else guys?"
- The teacher tells a new learner to read something that's underlined in her textbook.
2. Another learner says, "I don't agree. America wasn't aware. The bomb had never been used before so they weren't aware of the damage that they were going to cause and mostly civilians were affected and generations afterwards."
- Some learners start to clap with one saying, "Yay, I like that. I like that!"
1. & 2. The discussion continues with learners now referring to information in the textbook.
1. The teacher reiterates, "Why were they justified in dropping an atom bomb specifically?"
- "And it's there? I know it is. It is even underlined."
2. A learner reads from the text, "Japan was never going to surrender unless it was completely destroyed."
1. "Okay nice. I'm just gonna leave it there. Japan wouldn't surrender."

- | |
|--|
| <p>2. "I don't believe America was right because after they dropped the first bomb and they saw the devastation, therefore three days later they dropped the second bomb..."</p> <ul style="list-style-type: none">- Another responds, "Then, there we go".- "... in a different city." |
|--|

This lengthy interaction shows learners trying to analyse the question that was posed by applying the knowledge they had gained from the video. However, some of them had difficulty articulating their views. The teacher used frequent questioning to guide them to the correct responses, insisting that they focused on the facts. In the end, they consulted the textbook to help them arrive at appropriate responses. The learners were then asked to complete the table that the teacher had drawn on the chalkboard with the headings Yes/No for homework and to discuss their views with the people with whom they had dinner. Lesson 2 was therefore an example of multiple knowledge processes of experiencing, applying and analysing to facilitate the meaning-making process.

Lessons 1, 3 and 4 were examples of the process of conceptualising with Stacey following the sequence initiation-response-evaluation. After watching videos on Japanese internment camps and prisoners of war without any follow-up discussion, the teacher moved on to the next topic in the textbook, 'Cold War, Communism vs Capitalism'. The class had briefly learnt about communism and capitalism earlier in the term. She began by asking learners, *"What is communism?"*, to which learners provided answers like, *"where no one is treated like an individual"*, *"classless"*, *"less freedom"*, *"under the leadership of a dictator"*. Stacey continued to ask, *"What else?"* to get learners to add to the definition. She used the same strategy to help learners conceptualise the term 'capitalism'. Conceptualising by naming continued with the teacher asking learners to *"to turn their notebooks to landscape and write 'Clash of Ideologies', then draw two overlapping circles"*. She then said, *"you're going to write everything for communism in red and everything for capitalism in blue"*. One learner then asked, *"Why are we doing red and blue?"* Instead of just providing the answer, the teacher used questions to get help learners arrive at the answer. Table 5.41 shows how the discussion unfolded.

Table 5.41: Lesson 4: Cold War

Lesson 4: Cold War <i>Teacher 1; learner 2</i>

1. "So, who did red belong to?"
2. "The bad power."
1. "So, which superpower?"
2. "Communism."
1. "No. Which superpower?"
2. "Communism."
1. "Which superpower?"
2. "The dictator."
1. "What's a superpower?"
2. "A country."
1. "Yes. A country. Which country?"
2. "Japan."
1. "Not Japan." She rolls her r's and says, "Rrrr".
2. A learner responds, "Russia".
1. "Yay. And who does capitalism belong to?"
2. "America."
1. "So, write that down if you're not going to remember it."
- "Write 'communism USSR', 'capitalism USA'."
2. The learners draw overlapping circles.
1. "You first need to understand the ideas of capitalism and communism so that we can discuss the Cold War. So, you don't need to understand anything else about term 2 yet, we just need to understand these ideologies. They will come up in your cycle test."

In the above interaction, it is evident that learners were guessing and were not focusing on the questions. After finally arriving at the correct response, the teacher informed learners that they only needed to understand the two ideologies for their test. To help them learn the concepts, she said,

A quick way for you to remember it is communism starts the same way as common, right? Common, average, everything's the same. Nothing's different. Capitalism starts with a Cap. Right if I say to you guys you can wear whatever cap you want tomorrow. How many if you will come in your school caps cause they're free? You are wanting to save up and buy the cap that you want to wear. The same as capitalism.

Here, the teacher attempted to use an example from learners' experience to help them remember the difference between capitalism and communism.

In Lesson 4, Stacey distributed a handout with the title *Cold War, Communism vs Capitalism* as the class was going to be discussing the Cold War and the role of the two superpowers. Both the

handout and the textbook were used as sources of information. There was a large heart on the front page of the handout on which learners wrote information. Some information was read from the textbook or dictated by the teacher. For example, she told them to write “*not a full-blown war*” in the speech bubble as a definition of ‘Cold War’. They wrote Harry Truman, the name of the US president at the start of the Cold War, in the American side of the heart as they were told. This process of conceptualising by naming continued for most of the lesson, after which learners briefly worked individually before commencing a brief discussion on the space and arms races.

The tasks during the fifth lesson gave learners the opportunity to analyse multimodal texts critically and functionally, commenting on the Cold War as well as to apply all the knowledge gained appropriately to answer comprehension questions. The class first analysed a cartoon depicting two enemies in a barrel of gasoline, one with three matches and the other with five and discussed how it related to the Cold War. The task of identifying figures of speech required learners to analyse the texts functionally. Another knowledge process that was used in the analysis of the texts was experiencing. In the first instance, the teacher appealed to learners’ prior knowledge about braais to help answer the question “*What does Sagan, the American philosopher, think about the arms race?*” One learner did not know the answer so Stacey asked, “*When you’re having a braai at your house, would your dad and uncle go into the barrel with the fire?*” That learner responded, “*No*”. The teacher followed up by asking, “*Why?*” to which the learner responded that it would be dangerous and stupid. The teacher then posed the initial question again and the learner finally made the connection. Learners were able to experience the song *Russians*, which was the second source text, when the teacher streamed it from YouTube.

The last question required learners to debate whether or not nuclear weapons should be banned. This provided another opportunity for critical analysis. Table 5.42 is an extract from the discussion.

Table 5.42: Lesson 5

Lesson 5 <i>Teacher 1; learners 2</i>

1. The teacher reads the last question, which tasks learners with having a debate about whether or not nuclear weapons are necessary today.
2. One learner says, "I personally feel they should be destroyed for world peace."
1. The teacher then asks, "Who is going to counter that?"
 - Another learner says that there's evil in the world and you don't know what someone would do so you need to defend yourself.
1. The teacher again asks, "Who is going to counter that?"
2. "I don't believe you can defend yourself because you can destroy yourself and the entire world."
 - Yet another learner suggests that they should be kept in an enclosed space where only certain people have access to them.
1. The teacher asks, "Who decides who has access to them?"
 - The teacher adds that while she agrees that there shouldn't be nuclear weapons, sometimes having them could be a deterrent against war.
 - She then discusses the fact that the atom bomb that was dropped on Hiroshima and Nagasaki destroyed more people than both world wars combined.
 - She suggested that there's no right nor wrong answer but learners needed to be able to justify their answer.
 - She then posed the question, what do we need to be able to justify?"
2. The learners respond, "Facts".
1. The teacher then tells them, "So, go home and get your facts right."
 - The learners are told to do the same question for homework. They have to write the answer as a paragraph.

This short example of critical analysis was scaffolded by the teacher's questions. Stacey emphasised that learners needed to be able to justify their answers as there are no right nor wrong answers. They were then asked to complete the assignment for homework. Lesson 5 therefore represented use of the four knowledge processes, namely conceptualising, experiencing, analysing and applying.

In conclusion, Lessons 2 and 5 represented a blend of knowledge processes involving multimodal sources of information as Stacey and learners jointly made meaning in the classroom. The streaming of documentary videos as well as the music video indicated the importance of giving learners an authentic experience of the use of the atom bomb and its consequences as well as experience the song *Russians*. In another instance, Stacey referred to learners' lived experience of a braai to assist with visual comprehension. However, no other attempts were made to recruit learners' lived experiences in the conceptualising process that dominated.

5.4.3.3 *Patterns of interaction in the English classroom*

The tables and chairs in Palesa's classroom were arranged in single rows facing the chalkboard with a drop-down screen to the left of the board. The teacher's desk was at the front left of the classroom. During observations, the configuration of the tables and chairs remained the same as there were no group activities that required learners to sit together.

Because of Palesa's expressed fears about being made redundant due to the use digital technologies in her English lessons, there was hardly any sustained engagement using digital devices. On two occasions, learners used their cell phones to look up the meaning of a word on Google. They also copied chapter summaries of the literature novel *The No. 1 Ladies Detective Agency*, which the teacher had prepared in PowerPoint and projected onto the drop-down screen. The latter represents medium student-content interaction as learners spent the entire lesson passively copying the summaries.

Additionally, during the final two lessons observed, learners continuously and passively watched the movie *Strictly Ballroom* for their film studies with no discussion nor engagement with the teacher. This represented low student-content interaction with technology. Notwithstanding, Palesa's lessons were very interactive as she generally engaged learners in discussions and involved them in the meaning-making process. Interactions largely centred around written texts from either the *Explore* English textbook or the novel *The No. 1 Ladies' Detective Agency* and mainly demonstrated a blend of teacher-student interaction and teacher-student-content interaction, and on a few occasions, teacher-student interaction with student-student and student-content interactions.

Evidence of the blend was immediately observed during the first lesson as the teacher moved between teacher-student and teacher-student-content interactions. Palesa first read from the text, and then paused to discuss what was read. This led to a deeper discussion, connecting what was read about one of the characters' love for the main protagonist and his love of country, which shifted teacher-student interaction to teacher-student-content engagement.

Lesson 2, which occurred later in the same day, started with the teacher and learners discussing some of the summary comprehension questions. Table 5.43 is a brief extract from the lesson, which are analysed further in section 5.4.3.4

Table 5.43: Lesson 2: Literature—peripheral discussion

Lesson 2: Literature—peripheral discussion <i>Teacher 1; learners 2</i>	
1.	“What was the name and surname of the man Precious met?”
-	“How did she meet this character? I’d love to remember how she met him.”
2.	The learners provide answers.
1.	After discussing how he proposed to Mma Ramotswe, the teacher asks, “What was different about this proposal?”
2.	“They didn’t really know each other.”
1.	& 2. They continue to discuss the character of the man, who is abusive but good looking, and him being a stereotypical, good-looking African male who is also abusive.
1.	The teacher asks, “Do you feel it’s a fair stereotype?”
2.	One male learner replies, “Not all men are the same.”
-	A female learner asks then, “Why do we say that all men are trash?”
1.	The teacher says they’ll get back to that after Chapter 6.
-	She then tells learners to put their books away as they are going to have their Friday discussion. The discussion is based on a previous question about men being referred to as trash.
-	The teacher then asks, “Does anybody know how this # [hashtag] started?”
2.	A female learner refers to toxic masculinity.
-	Another attributes it to feminists in America. Says it was trending on Instagram.
-	Another learner says that she thinks that the person who made the statement must have been heartbroken.
-	Another argues that not all feminists felt that way as feminists are concerned with equality.

The brief teacher-student interaction that required learners to recall aspects of the plot of the story led to a discussion about the stereotyping of one of the characters, further prompted by the teacher’s question, “*Do you feel this is a fair stereotype?*” One learner responded to the question by asking, “*Why do we say that all men are thrash?*” This led to a lengthy interaction between the teacher and learners about the question as the teacher suspended the literature lesson for “*their Friday discussion*”. This was an example of high teacher-student-content interaction that followed low teacher-student content interaction.

The third lesson was an example of medium teacher-student interaction as the teacher and learners continued exploring the brief comprehension questions from the novel, which the teacher first read. Table 5.44 is an extract from the lesson.

Table 5.44: Lesson 3: Comprehension questions based on novel

Lesson 3: Comprehension questions based on novel <i>Teacher 1; learners 2</i> 1. One question was, “Why was it easier to trick Mma Ramotswe?” 2. She disagreed with ... 1. “Was it the correct thing?” 2. “She should have found out more.” - “Her personal view took the place of her professional view.” 1. The teacher then asks why was there always a reference to ‘the tiny white van’. 2. “It’s a lorry.” - “It’s very tiny.” <i>The learners are having difficulty deciphering the reference.</i> 1. The teacher draws the Nike logo on the chalk board and asks what this represents. 2. They immediately recognise the brand and make the link that the ‘Tiny White Van’ was the brand or symbol of <i>The No. 1 Ladies Detective Agency</i>. <i>The question and answer session continues with some learners guessing the answers. It’s not clear if they had read the entire book. The same kids seem to be answering the questions. Not everyone is participating.</i> 1. “What is assertiveness?” 2. “I can’t give a definition.” 1. “Well, give me an example.”

This brief extract shows the teacher guiding the learners to decipher the ‘tiny white van’ reference. By drawing the Nike logo and asking what it represented, she was able to guide learners to understand what the reference meant. However, several learners seemed to be guessing the answers as it did not appear as though they had read the entire book. Later in the lesson there was a missed opportunity for teacher-student-content interaction to unpack the meaning of the name ‘Kremlin’ of one of the characters.

Apart from the blend of teacher-student and teacher-student-content interaction, Lessons 5 and 7 were examples of a blend of medium teacher-student interaction and medium student-content interaction. Using content from the textbook, the teacher reviewed information about how to write descriptive and narrative essays, which they seemed to have done prior to observations as Palesa started by saying, “*We’re going back to descriptive and narrative essays*”. Learners were

constantly encouraged to use the thesaurus so that they could “*use their words well*”. She cautioned that there was only one thesaurus in the classroom so if learners were stuck, they could use her. Learners instead could have been encouraged to use an online thesaurus since Wi-Fi is pervasive throughout the school. Learners spent the latter half of the lesson writing descriptive and narrative lessons.

Lesson 7 also reflected medium teacher-student interaction with missed opportunities for teacher-student-content interaction as the class did film study based on images of posters found in their textbook. The discussions that ensued were superficial and mainly focused on decoding the visual images without interrogating the contexts. The two posters studied were based on the movies *Gone with the Wind* and *Breakfast at Tiffany’s*. Given the accessibility of a multitude of content on the internet, this could have been an opportunity for learners to interact around online content to find out more about the context of the films, thereby enriching the discussions. Learners worked mainly in groups, although one learner worked alone, to complete the activities at the end of the task. This represented the only example of medium student-student interaction and one instance of student-content interaction. This lesson is examined further in section 5.4.3.4.

Lesson 8 was an example of medium teacher-student interaction as well as medium teacher-student-content as Palesa and learners made sense of two African poems, one a South African praise poem and the other a Ghanaian poem. The initial interaction elicited brief minimum learner engagement in response to the teacher’s questions. Since there was the view that this praise poem did not qualify as a poem, the teacher initiated a discussion about poetry structure, which resulted in learners being more engaged. After briefly describing the structure of a praise poem, one learner stated, “*I can’t relate to this poem. I can’t even recognise this as a poem*”. Table 5.45 is an extract from the medium teacher-student-content interaction that ensued.

Table 5.45: Lesson 8 (continued)

Lesson 8 (continued) <i>Teacher 1; learners 2</i>	
2.	After a discussion about the significance of different animals in the Tswana culture, one learner exclaims: “Yes ma’am! I can’t relate to this poem”.

- "I can't even recognise it as a poem," says one girl.
- 1. The teacher then says, "Let me challenge you. Is music poetry?"
- 2. Some learners say yes; others say no.
- 1. The teacher then asks, "For those who say no, what doesn't make music poetry? Challenge me."
- 2. No response.
- 1. "Is country music poetry?"
- 2. Most learners say yes.
- 1. She continues, "Is rap music poetry?"
- 2. "Yes."
- "So/so."
- "I don't think so."
- "Poetry is a formal way of expressing yourself."
- "Rhythm is what makes music poetry, which makes music in the lyrical form but some music has no rhythm to it."
- 1. The teacher then tells the class to turn to a page where there is a rap song. She reads the lyrics as a poem.

Some of the boys are now excited.

- 1. The teacher then asks again, "Is music poetry?"
- 2. Most learners generally agree.
- 1. The teacher concludes that to an extent music is poetry, like praise poetry.

The learner's comment that she could not relate to the Tswana poem prompted a brief debate in response to the question, "*Is music poetry?*" Some of the boys became quite excited when the teacher referred to a rap song at the back of the textbook as this was clearly one of their preferred genres of music. This helped to increase their participation in the discussion.

Palesa's English lessons demonstrated the use of multiple modes of interaction, though student-student interaction only occurred once. Teacher-student interaction was sometimes blended with teacher-student-content interaction and on a two occasions with student-content interactions. However, although there were opportunities for learners to engage with content for an entire lesson, these engagements were passive as they were spent copying chapter summaries

The next section examines Palesa's pedagogical strategies.

5.4.3.4 Learning by design in the English classroom

A blend of interaction modes in Palesa's English classes also represented a blend of pedagogical strategies. The knowledge process of experiencing was often blended with conceptualising, and

Palesa often tried to appeal to learners' interests. Learners were allowed to express themselves freely as discussions were not restricted to the teacher's preferences.

Firstly, the choice of literature text, *The No. 1 Ladies Detective Agency*, was quite relatable to learners and addressed issues with which they could identify. As she explained during our interview,

It's very important cause if they don't see themselves in it, they don't understand it, that is why. So basically, I try to bring it home as much as possible to show where they fit in, to show them how they relate to it. And even if they don't relate to it, to show them why they might not relate to it and then how to interpret something when they don't relate to it.

This comment indicates the importance of the knowledge process of experiencing, which values learners' interests and lived experiences. This was evident in discussions about Botswana and Africa, appealing to learners' 'Africanness' to make the story more relatable. As such, it signals the importance of valuing learners' epistemological diversity.

In their discussion on one of the characters in the story, Palesa asked, "*How do you think he would relate to Africa as the continent? What idea would you get from him thinking about Africa and relating it to his Mma Ramotswe?*" She was appealing to the familiar as learners nostalgically connected the beauty of the continent and the comfort of being at home in Africa to the way the character felt about his partner, Mma Ramotswe.

Upon completion of the novel, the teacher asked learners to share their views about the story and if they enjoyed the story. Table 5.46 shows their responses.

Table 5.46: Lesson 2: Literature

Lesson 2: Literature
<i>Teacher 1; learners 2</i>
2. Most learners say yes.
1. The teacher then asks how different it was from their Grade 8 text.
2. One learner responds, "This is more of a cultural or traditional book. <i>Outside</i> is more Western, like in a neighbourhood".
1. They continue to discuss, then the teacher says, "The most shocking part of the book was the way it went into detail about abuse". She then asks, "Should the abuse have been there or should it not have been there?"

2. "Yes."
 - "It gives us more of an understanding of Mma Ramotswe."
 - "It gave us more of a platform to relate to it."

The comments made by the learners further demonstrate that they were able to connect with the subject matter as well the context to the text, which suggests the opportunity to experience the known.

In addition to the knowledge process of experiencing, the first lesson was also an example of the knowledge processes of conceptualising and analysing. The process of analysing critically was observed as the teacher and learners interrogated the use of stereotypes in the novel by discussing whether a non-African, and in particular a white male, would be able to capture succinctly the essence of African culture. However, there were inaccuracies in the teacher's description of the author's identity, which could have been remedied easily by an internet search. This would have contributed to a richer and more accurate discussion. Table 5.47 is an extract from this discussion.

Table 5.47: Lesson 1: Literature

Lesson 1: Literature

Teacher 1; learners 2

1. She tells the class, "Before you close your books, there's one thing I want you to look at. Right at the back you see the picture of the author. Let's look at the interesting things about this author: no 1, he is an old British man; no 2, he is and old white British man; no 3, he's an old white British man who is a lecturer of medical law at the University of Edinburgh. So, does this throw you off in terms of everything you thought an African author would be?"
2. There are a lot of yeses.
 1. The teacher asks for an explanation. "How so?"
 2. "Ma'am, the way you and other people relate to the book in terms of culture, I wouldn't expect somebody who is not of the same culture to relate to it as much as he did in the book."
 - "It's a surprise how he uses the names."
 - Another mentions "the perspective from how he wrote it" being surprising.
 - "From the cultural side of it, you wouldn't get that he was a white guy."
 1. The teacher explains that there's one thing the author relied on a lot. He came up with the stereotypes that everybody knows ... She discusses the stereotypes in the book.
 2. "Wouldn't you consider the way he describes Mma Ramotswe as a stereotype?"
 1. "Yes. It is a stereotype. The typical African woman. And the fact that he waits until he's ¾ into the book to say that she is a size 22 because your idea of what is an African woman might have been very different until you get to the fact that size 22 is not typically African ... But the other thing you need to notice is the way he uses colloquial language to make it seem like he's been in Botswana, he's grown up in Botswana. He is a Botswana person. The language was important. It was as if you were stepping

into his shoes and you could almost see Botswana in front of you how he describes the way vegetation changes ...”

Another way in which the teacher related activities to her learners’ interests was to provide opportunities for them to share experiences and engage in topics of interests. This was observed during the second lesson when Palesa told learners to put their books away for their Friday discussion, which suggested that this was a regular occurrence. The discussion that ensued was based around the question “*Why do we say that all men are trash?*”, which was raised in the literature lesson. Table 5.48 is an extract from the discussion.

Table 5.48: Lesson 2(b)

Lesson 2(b)

Teacher 1; learners 2

1. The teacher tells the learners to put their books away as they were going to have their Friday discussion. The discussion is based on a previous question about men being referred to as trash.
 - The teacher then asks, “Does anybody know how this # [hashtag] started?”
2. A female learner refers to toxic masculinity.
 - Another attributes it to feminists in America. Says it was trending on Instagram.
 - Another felt that the person who made the statement must have been heartbroken.
 - Another argued that not all feminists felt that way as feminists were concerned with equality.
1. The teacher explains the origin of the phrase and the role of social media in perpetuating the perspective.
 - She refers to other stereotypical statements.
 - She then mentions Harvey Weinstein, R. Kelly, taking advantage of women.
 - She also refers to stereotypes about South African people, about IsiXhosa and Pedi women.

Mainly Black girls participating; white and Indian girls as well as white boys remained silent.

1. The teacher asks one of the Black boys who isn’t participating for his views.
2. He responds that he is not trash.
 1. She then says, “Let’s contextualise it”.
 2. One girl says, “Boys are players”.
1. The teacher asks, “Why are men referred to as players and women referred to more harshly?” She asks the learners for their perspectives.
2. One girl says that girls are supposed to submit and be underdogs.
 1. The teacher speaks the cultural, historical context and the issue of polygamy.

This discussion, an example of experiencing, referred to recent issues in the media and social media, particularly the #MeToo movement. The teacher briefly addressed issues of stereotypes, including ethnic stereotypes. However, although the issues raised were intended to engage the entire class, one group of learners dominated the discussion while the others were either silent

or participated at a minimal level. This lesson, which was intended to engage with learners' experiences to facilitate their analysis, deviated from discussing toxic masculinity and the issue of stereotypes to one that denigrated one segment of the population.

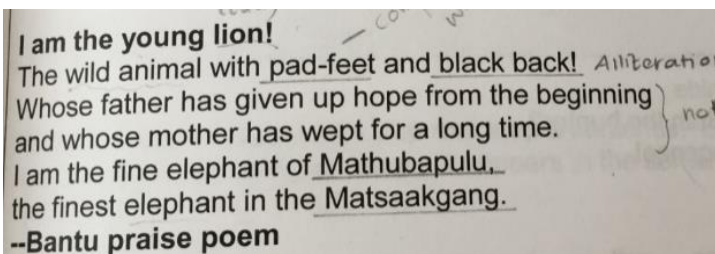
In our interview, Palesa stated that this type of informal engagement with learners is *"to build that critical thinking"*, which she stated was difficult in their normal English lessons. However, *"when I start speaking about general things, they then think oh, and then we can apply it"*. This lesson above is also an example of analysing as learners attempted to analyse the statement about *"men being referred to as thrash"*, an issue that seemed to resonate mainly with Black female learners.

Lessons 6 and 8 were examples of the process of analysing critically and functionally. During Lesson 6, learners explored the South African poem *Master of the House* and examined the theme and various figures of speech and discussed their effectiveness. Learners also studied two African praise poems in the eighth lesson. Functional analysis involved the class examining figures of speech, the rhyming scheme and extended metaphor. However, the teacher spent a lot of time discussing the meaning of the poem and decoding the poem as the process of analysing critically seemed to pose a challenge for the class, as previously mentioned by the teacher. This meant that the process of conceptualising was the dominant strategy instead of the intended functional analysis of the poem. Table 5.49 is a part of the discussion that occurred.

Table 5.49: Lesson 8: Praise poetry

Lesson 8: Praise poetry

Teacher 1; learners 2



I am the young lion!
The wild animal with pad-feet and black back! Alliteration
Whose father has given up hope from the beginning
and whose mother has wept for a long time. } not
I am the fine elephant of Mathubapulu,
the finest elephant in the Matsaakgang.
--Bantu praise poem

- The teacher reads the poem again, then asks learners to identify the figure of speech. They discuss this; then she asks, "What type of praise poem is this for those who know the language?"
- 2. Some learners respond, "Tswana".
- 1. The teacher then discusses the significance of animals to the Tswana people.
- She asks, "Why is it called a Bantu praise poem? When was it written?"

2. Some learners respond, "During apartheid".
1. She then asks, "What does 'Bantu' stand for?"
2. Learners do not respond as they don't seem to know.
1. The teacher says it was used to refer to Black African people during apartheid.
- She then asks, "What is the figure of speech of the poem?"
2. One learner responds, "It's an extended metaphor. It continues with the 'I am'".
1. The teacher then asks, "What is the purpose of the poem? When you think of the animals, what do they tell you?"
2. One learner says strength.
- Another says courage.
1. The teacher continues by asking, "Why do you think the father has given up hope from the beginning?"
2. The learners give responses that the teacher isn't pleased with.
1. The teacher says, "Let's go back. When was it written?"
2. "Apartheid."
- "Maybe he's going against the rules."
1. "How?"
2. "He's trying to say his father is breaking all the rules."
1. "Wild animals are very independent. Even though he's independent, he will never be free."
2. "What do you mean that he would never be free?"
1. The teacher asks, "When was he born?"
2. "In apartheid."
1. "And what was the one thing apartheid took away from you?"
2. "Freedom."
- "Yes ma'am! I can't relate to this poem. I can't even recognise it as a poem." Says one girl.

In our interview, Palesa indicated that critical analysis was *"easier said than done"*. She added that learners *"can't read between the lines, they can't think critically"* so *"I give it to them cold"*, meaning she has to do most of the explaining. In the above extract, it is also clear that although this is a South African poem, learners had difficulty understanding the references, making analysis challenging. Given the difficulty the learners had understanding the references in the poem, perhaps more time should have been spent on conceptualising before attempting to analyse it. Given the accessibility of Wi-Fi and other sources of knowledge on the internet, perhaps videos of praise poetry being performed could have been played as a means of experiencing the new so that learners would be able to appreciate and make sense of the poem. Additionally, one learner at the end of the excerpt stated that she could not relate to the poem, which prompted a discussion about whether the poem could actually be classified as a poem. The discussion that ensued explored the question whether music is poetry, to which most

learners agreed. The teacher read the lyrics of a rap song from the back of the textbook and most of the boys became enthused. Again, more time could have been spent analysing the structure of a poem and comparing this to the structure of a praise poem to provide a richer learning experience. During our interview, Palesa commented that learners engaged more with Eurocentric and Western texts because “they’re used to it”. She added, “I find that Eurocentric is easy for them. African literature tests them a little bit. They know it because it’s everything that they see ...” However, this seems to contradict with their earlier response to *The No. 1 Ladies Detective Agency*.

As part of their film study during lesson 7, learners did a visual analysis of two movie posters found in their textbooks, *Gone with the Wind* and *Breakfast at Tiffany’s*. Because the two movies and their contexts were unfamiliar to learners, they could not relate to the texts, prompting one learner to say, “It’s boring”. The teacher’s pedagogical strategy indicated the initiation-response-evaluation sequence as observed in the extract in Table 5.50.

Table 5.50: Lesson 7: Film study: Poster analysis—Breakfast at Tiffany’s

Lesson 7: Film study: Poster analysis—Breakfast at Tiffany’s

Teacher 1; learners 2

1. The teacher asks, “What is Tiffany’s? Does anybody know?”
2. “It’s like a jewellery, like a ...”
1. The teacher adds, “It’s a jewellery store”. Then asks, “What is significant about Tiffany’s?”
2. “Gold.”
- “It’s expensive.”
1. “Not expensive. It’s that little blue box. The idea of getting that little blue box from Tiffany’s no matter how small the gift is ... as long as you get that little blue box with the bow, that is what is significant.”

The boys are not really engaging with the texts.

1. “Look at the picture of Audrey Hepburn. What message is the creator trying to portray using the clothing as well as the accessories?”
2. “Ma’am she looks fancy, but like wild.”
1. “Give me another word for wild? She was wild. She was then viewed to be what?”
2. “She was bold.”
1. “She was independent. She held her own. The fact that she is the dominant figure in the picture, makes you see that she is what?”
2. “Independent.”
1. “She is independent. She doesn’t need like *Gone with the Wind* a manly figure or a man to dominate the frame. The accessories also show that she has money.”

This extract shows the teacher initiating the interaction by posing a question after which a learner responds, followed by the teacher's statement confirming and expanding on the response. The opportunity was therefore missed for deeper analysis of the posters as learners could have conducted online research of the two films prior to the lesson in preparation for the discussion. This would have made the learning more meaningful. At the end of the initial period of engagement, learners worked in pairs, except for one learner who worked alone, to complete the activities.

In Lesson 5 in Table 5.51, the teacher used conceptualising by naming and with theory to help learners understand how to write narrative and descriptive essays. She appealed to learners' personal experiences and their senses to help them understand how to construct narrative and descriptive essays. They then appropriately applied the knowledge gained during the process of conceptualising to create descriptive and narrative essays.

Table 5.51: Lesson 5: Narrative and descriptive essays

Lesson 5: Narrative and descriptive essays <i>Teacher 1; learners 2</i>	
1.	The teacher tells the learners to take out their <i>Explore</i> textbooks and turn to page 74.
-	She says, "We're going back to descriptive and narrative essays. You need to use your words well. My thesaurus is going to force you to use your words well. Write to the best of your ability. Get to the nitty gritty of what you're doing. What makes a narrative essay?"
2.	"It is a personal experience."
1.	"Yes, it is a personal experience. You're basically taking a person on a journey. A journey through that experience that you went through."
-	"What is your aim? What do you want people to get from the story? Come, when you think of a personal experience."
2.	"How you felt. What you went through."
1.	"Yes. How you felt. What else? You're also looking at them empathising with you. Everything that you went through. If you're talking about certain emotions, a heavy feeling, how heavy it was. Ok, so you need to think about how heavy it felt."
-	She then gives the example of a Grade 8 learner who spoke about losing their mother... Descriptive essays, that's where you do really well. However, I would want you to use the thesaurus because some of you, for example, what I picked up in 9d is you have the basic word but you're not developing the word. What do I mean by developing the word?"
2.	"Elaborating."

Aspects of Lesson 2 and the entire Lesson 3 where the teacher and learners discussed the comprehension questions based on the literature text were difficult to analyse using the learning

by design framework as they focused mainly on recalling information from the text. Questions such as *“What was the name and surname of the man Precious met?”*, *“How did she meet this character?”*, *“Who is Precious’ father?”* and *“What is the name of the detective agency?”* seemed to be pitched below the cognitive level of the learners. There was also a missed pedagogical opportunity to critically analyse the name of one of characters in the novel. Palesa asked learners to explain why the name Kremlin was a fitting name for him and one learner replied, *“It sounds like gremlin”*. The teacher followed up by asking, *“When you think of Kremlin, how was he first described?”* Learners described his looks. The teacher concluded the discussion by saying, *“Kremlin sounds like ‘creamy’ suggesting guilty pleasures”*, demonstrating that the teacher was also unaware of the origin of the word, and hence, the reference being drawn by the author.

In summary, Palesa used the four knowledge processes to make meaning in the English classroom and on many occasions blended the knowledge processes of conceptualising, experiencing and analysing, with the knowledge process of experiencing being dominant. Palesa’s discussions generally appealed to learners’ interests as she frequently referred to aspects of African culture with which a large number of learners were familiar. The freedom to express their views and to deviate from the lesson through opportunities for discussions based on their interests and experiences all contributed to harnessing their diversity. However, although learners were provided with opportunities to analyse texts functionally and critically, these were generally superficial, demonstrating low cognitive demand. There were also missed pedagogical opportunities due in part to gaps in the teacher’s knowledge, highlighting the need for greater lesson planning and research to build background knowledge.

5.4.4 Teachers’ Perceptions of the 21st Century Classroom

In expressing his vision of the 21st century classroom, George, the principal, stated that his focus was keeping classrooms, especially the Maths and Science classrooms, small. He also indicated that it was important to *“upskill teachers at all times”*, citing training in anger management, bullying and social media. However, no pedagogical training was mentioned.

Paul, deputy principal and the Head of IT, framed his future vision in terms of *“collaboration and connectivity”*. He pointed out that *“the connectivity and the collaboration between the teachers*

and the students and also between the teachers themselves as well” are crucial. This involves different departments “sharing ideas, sharing documents, sharing resources and things like that in the cloud space”. He added that they were moving away from physical documents and textbooks and moving more into the digital cloud. The goal is “to get the teachers and the students to connect in a digital space and not just writing things down and handing them in to the teacher”.

While Paul imagined the future classroom to be paperless, the principal stated that the MEC for Education in Gauteng had spoken about paperless classrooms, but added, *“I don’t see that ever happening really completely because at the end of the day you’re testing knowledge and we can’t lose the skill of how to write either”*. His comment *“you’re testing knowledge”* suggests a very traditional approach to learning, which was evidenced in his statement, *“I am an old-school teacher, so chalk and talk”*. Nevertheless, despite his traditional views, he suggested that *“in the future, this [lifting up his smartphone] will become more and more prevalent in the classroom”*. He added that *“the classroom of the future would be just smarter technology, not necessarily more technology. I think the apps and the programmes will just get smarter and more involved”*. Yet, he stressed, *“I don’t see the classroom itself changing significantly”*. However, they both seemed to agree that one of the challenges to the use of technologies is the resistance of older teachers, who Paul indicated are *“a bit more scared”* and need more hands-on training while *“the young modern teachers are certainly more equipped to teach very well”*, according to the principal. However, the classroom observation and interview data revealed otherwise.

Palesa, the English teacher, expressed her misgivings regarding the use of digital technologies as it detracts from the classroom experience, especially in English, and will make the teacher redundant. Unlike the Head of IT who felt that teacher should be using less paper and more digital texts, Palesa believed that learners need to be able *“to engage with text”* and *“feel the paper”*, which help them engage with what they are reading. She added that, *“There’s a beauty in writing and writing is now becoming very elementary. It’s becoming secondary to technology”*.

Stacey, the History teacher mentioned that a flipped classroom approach would be ideal in the 21st century classroom *“to not do any teaching in the class but for them to do the self-studying at home and then do more discussions in class. So, it would be like watching the crash-course videos*

or creating videos of our own to inspire the discussion in class and then the research at home". However, she identified challenges to the flipped classroom approach, such as language barriers, where *"the kids often don't understand what they're reading, so even just with our lesson today the word 'obliterate', they don't understand what that means and instead of going and research it, they'll just read past it and ignore it"*. She added,

Even the smart phones to be used in Teams and stuff in class, not all of the kids have smartphones or access to that stuff. So, I just feel stuck in it that I can't do it if even there's just one kid in the class who doesn't have access cause they are at an immediate disadvantage.

The principal expressed a wider vision for the future classroom that is beyond the use of digital technologies and is focused on the types of skills being imparted to learners. In our interview, he emphasised the need for life skills, which he said are very important in the 21st century. He said, *"Life Orientation should change to teach life skills because life skills are the problems with young teachers today"*. He then added that *"there should be far more emphasis on teaching kids how to survive in the modern world"*. In addition, he highlighted the need for creative and innovative thinking. Palesa, the English teacher also articulated the view that critical thinking and creativity are important skills in the 21st century. However, she seemed to have a different understanding of what is meant by creativity as she likened it to creative writing as well as to creativity in technology, since she also taught design and technology.

On the other hand, the History teacher equated 21st century skills to holistic teaching. She too was of the view that critical thinking and creativity are important. In terms of creativity she said, *"it's getting more creative and think about more fun ways to do the lesson. So, like creating game boards for the kids to spot test them on different topics. So, I focus more on the creative cause that's where my passion lies"*. She also had a different perception of what creativity is.

In conclusion, the views expressed by the teachers suggested different perspectives of the 21st century classroom. In particular, the principal and his deputy expressed competing views about the appropriation of digital technologies in the school, revealing a lack of shared vision,

particularly between the two school leaders and the two teachers in regard to the use of digital technologies and the classroom of the future.

5.5 SOUTHRIDGE HIGH SCHOOL

5.5.1 Context

Upon entering Southridge High School I was struck by the hum of learning. There was a quiet tone in the school. Between lessons, learners quietly moved from one class to the next. They filed down the stairs in rows and greeted me politely. There was an obvious orderliness and discipline. Even during break time, when noise levels in schools are usually elevated, learners' voices barely reached noise levels.

During our interview, the principal stated, "We want teachers to control lessons and control the content but in a way that allows the child to learn". I could not help but wonder if that control had not subtly permeated areas outside the classroom.

Southridge High can be described as a very traditional school where the locus of control clearly rests with the teacher, as the principal explained. This former Model C government school is located in the northern suburbs of Johannesburg. It is in a well-developed affluent part of the city. At the time of observations, the school had a student population of about 1 500 learners and 83 academic staff. Like Hampton High School, there are disparities in learners' access to resources and according to the principal,

You've got some children coming from wealthy families and others not from wealthy families, and it does have an impact in terms of education because the children from the wealthier families have got all the resources and have had access to extra lessons and access to coaches and things. They wanted their children to excel at or do better at. Whereas your less privileged children have found it very difficult without the support and the kind of resources that the wealthier families have had.

Being a government school, they followed the CAPS curriculum, and Anton noted that *"there's a lot of learning that's imposed upon schools"* since the curriculum is very extensive and individualistic. This he found very constraining particularly for the teaching of other skills like

critical thinking and problem solving. He remarked that they are *“limited in terms of the extensive CAPS curriculum (so) that discourse where you sit and interact and discuss, there’s not much time”*. He added, *“We’re also hamstrung by what the DoE wants us to do ... So, we don’t have that kind of scope; so, we do have to do what we are mandated to do by the DoE”*. As a government school, teacher learning activities are provided by the DoE. Hence, teacher professional development activities in the use of digital technologies are rarely conducted at Southridge High School. Mariette mentioned that *“the GDE [Gauteng Department of Education] does offer workshops ... there are workshops available, not just for the use of technology in the classroom but any support skill, upskilling for teachers is available*.

Data collection included interviews with Anton, the principal, who had been headteacher at the school since 2003, and the Megan, Head of Computers, who had taught at the school for 15 years. I also interviewed Mariette, the Grade 9 English teacher, whose Grade 9 English class was observed. She is not only a former learner at the school but has spent most of her teaching career at Southridge High. She has therefore been teaching at the school for just over 13 years. In addition, I interviewed Natasha, the History teacher, who has taught at the school for 13 years, starting in 1997. She has left and returned one year prior to classroom observations. Her History lessons with the same Grade 9 learners were also observed.

Observations occurred a few weeks prior to the end of the second school term and the teachers’ focus was on completing the syllabus for that term and preparing learners for the upcoming examinations.

The next section examines the adoption and use of digital technologies at the school.

5.5.2 Digital Technologies at Southridge High School

The school’s strategy for the use of digital technologies in teaching and learning is to provide teachers with access to Wi-Fi and an iPad. In my interview with Megan, the Head of Computers, she stated that the biggest improvement with regard to digital technologies at the school was *“the fact that the teachers have been issued with iPads and that the classrooms all have data projectors in them”*. She said that this allows teachers *“to present a multimedia lesson”*. However,

given the large student population it was not feasible to give all 1 500 learners continuous access to the school's wireless network. She stressed that *"we just don't have the capabilities to connect 1 500 children to our Wi-Fi because then nobody would get any internet. It would slow it down too much"*. This was also highlighted by the principal and by Natasha, the History teacher, who stated that *"in this school we are limited by resources"*.

Consequently, access to the school's Wi-Fi is mainly provided to the staff and learners from Grades 10 to 12 who study CAT and IT, which suggests a focus on learning *about* and learning *with* computers for the benefit of a small number of learners. For the rest of the learners there are two computer laboratories, each with 30 computers, and a library with 10 computers connected to the Wi-Fi that learners can use after school for pedagogical purposes. Megan confirmed that learners in Grades 8 and 9 are not provided with any form of computer literacy training by the school because *"with over 300 children in a grade with two computer centres we wouldn't be able to teach anything else"*. However, the school does have a BYOD policy, and according to Megan, *"they can bring their own devices with textbooks on them"*.

The principal did not share the view that learners need to have continuous access to digital technologies. This was evident in his question, *"Why would everybody need to be online at the same time?"* when asked about the use of digital technologies, and in particular, learners having continuous access to Wi-Fi. He expressed the view that continuous online access for learners is unnecessary and suggested that this will detract from teaching and learning and limit teacher control. He stated the following:

You've got your work and you want the children to work with what you're dealing with, specifics. Our teachers all have iPads. We've paid for each of them to have iPads and a projector in the classroom. So, we want the teachers to control that environment, and if they choose, then to use the Wi-Fi to look at something live, they can do that. But we certainly don't want it where the children are encouraged to WhatsApp each other, send messages and go online themselves, except maybe at break time ... So, there's no direct need for that all the time. We just need to know that when we introduce Wi-Fi to everybody, it's not going to be distracting.

He added, *“when everything becomes digital, then you’d start asking yourself why do we need then to go to school when we could all sit in front of a computer?”* He stressed the importance of human contact in education since *“there also has to be the human value-add to the dispensing of teaching”*.

The principal held the belief that not all learners are suited to working with computers and opined that only those with an aptitude for mathematics and science are suited to working with computers. Their different *“thinking styles”*, he added, determines their interest in technology. He added that only those with *“a very broad and generalised, and linear approach to thinking in a sequential way (and who) are normally a little stronger in Maths and the mechanics of IT”* would do well with computers. Whereas *“those who look for context and prefer working with something that you can turn the pages back and forth, the old-style textbook, is for them”*.

In summary, the overall focus of the school’s strategy is directed at learning *about* computing, particularly through the teaching of IT and CAT subjects. The next section examines teachers’ appropriation of digital technologies.

5.5.2.1 Appropriation of digital technologies in the History classroom

The main forms of digital technology used in the classroom are those provided by the school, namely the iPad, the data projector and speakers. In our interview, Natasha, the History teacher, stated, *“The data projector is very convenient because you can use videos and things, especially with something like History, to bring it to life”*, and this would be *“whatever I put on my iPad and then I project through that data projector, so whether that’s videos or notes that put up”*. In addition, she uses *“memos going through answers to questions so that they [learners] can hear and see it”*.

Given the school’s policy concerning technology use and access to Wi-Fi, the teacher was the only person who used digital technologies in the classroom. In my observations of these History lessons, the teacher used her iPad and data projector in three of the seven lessons observed.

During the first lesson covering the end of World War II, Natasha began by recapping the atrocities committed by Japan and projected a world map showing learners the location of Japan.

Later in the same lesson she showed a YouTube video clip of the dropping of the atom bomb on Japan. Table 5.52 is an extract from that lesson where the iPad and data projector were used.

Table 5.52: Lesson 1: World War II—dropping of the atom bomb

Lesson 1: World War II—dropping of the atom bomb

Teacher 1; learners 2

1. The teacher starts the lesson by saying, “We’re discussing the story of Japan. She projects a world map pointing where Japan is located in relation to the USA”.

Later in the lesson:

1. The teacher sets up a video clip simulating the dropping of the atom bomb. She speaks about the consequences of radiation.
 - She streams a YouTube BBC documentary from her tablet titled *Hiroshima, Dropping the Bomb*.
2. Learners watch the video attentively. After a few minutes the video stops.
 - One learner suggests that the teacher double taps 10 seconds back and begins to guide her on how to get the video to play continuously.
 - Another learner asks, “Ma’am, why don’t you download the video?”
1. The teacher restarts the video but it stops again at the same place. In her frustration, she aborts the activity.

Because of the accessibility of visual and audiovisual content afforded by the internet and the availability of Wi-Fi, Natasha was able to present a multimodal lesson. A visual image in the form of a world map was used to show learners where Japan was located in relation to the USA and to provide context for the lesson. There was an aborted attempt to stream the YouTube documentary, which perhaps demonstrated the teacher’s lack of technological knowledge as she was unable to troubleshoot the problem. Two learners’ technical knowledge was revealed as they suggested ways to solve the problem.

During the second lesson, the teacher successfully streamed the video that was not completed the previous day. She explained the reason for showing the video saying, “*The idea of watching the video is for the class to understand that the dropping of an atom bomb is quite different from watching any other bombs*”. She then played a short video clip from her iPad for about four minutes. At the end of the video, the teacher carried on with the lesson about the dropping of the atom bombs in Japan. Later in the lesson she again projected a map of Asia to show places Japan had invaded during the Pacific Theatre of War.

During Lesson 3, Natasha used the digital devices available to stream another YouTube clip, this time about the battle of Midway Island. Table 5.53 is a short extract from the lesson.

Table 5.53: Lesson 3: World War II continued

Lesson 3: World War II continued <i>Teacher 1; learner 2</i> 1. She mentions that learners will be watching short video clip about the battle of Midway Island after which they will do their worksheet. - Before showing the video, the teacher describes events leading up to the Battle. - She then says, "If I ask you in an exam, we talk about the battle as a turning point". - She projects the YouTube video from her iPad onto the screen. The video is about the battle of Midway Island. 2. Learners watch attentively. <i>The video lasts 15 minutes.</i>

In the extract in Table 5.53, Natasha mainly harnessed the technological affordances and capabilities of the iPad and data projector to present multimodal lessons. This was because of the immediacy and accessibility of visual and audiovisual resources on the internet. This type of use of digital media was for representative purposes, where technology is used merely to transmit information with no functional change to the task.

Another way in which the teacher used the available technologies was to project a handwritten memo with the correct answers from one of the tasks in their worksheets. Table 5.54 is an extract from the lesson.

Table 5.54: Lesson 5: Worksheet review

Lesson 5: Worksheet review <i>Teacher 1; learners 2</i> 1. The teacher tells learners to take out their books and their worksheets, which she had marked previously. - She says they will be going through corrections. - She tells them that she will be going through the memo slowly. <i>A handwritten memo of the work sheet, which was prepared by the other History teacher, is projected onto the white screen.</i> 1. The teacher reads the first question: "What was the immediate cause of World War II?" - She tells learners, "The more detail you give, the better for you". - She reads verbatim from the memo on the screen then pauses to explain. - She says, "The allies follow a policy of ...". 2. A learner adds, "appeasement". - They all seem to copy verbatim from the memo that is projected. - One learner asks, "What do we study for the exam?"

1. The teacher indicates which pages from the worksheet need to be studied. She adds that they need to study maps and pictures.
 - She then says, "Back to our questions".
 - The teacher continues to read the questions and the answers given in the memo, pointing out what learners need to take note of for their exams.
2. Learners continue to copy word for word learners.
 1. The teacher tells learners not to copy word for word.
 - She continues to read until the end of the lesson.

In the above extract, the teacher mainly read from the memo as learners copied what was written without much discussion. As they copied, they were told what they needed to focus on for their upcoming examinations. This activity was another example of the representative use of digital technologies where the teacher used the projection and presentation capabilities of the available resources to show the memo for the task.

In summary, Natasha used the digital technologies at her disposal to transmit information with no fundamental change to the task. The focus was therefore on learning *from* digital technologies. This representative use of media saw few affordances of the available technologies being used. These affordances can be optimised if learners also have technological access in the classroom; however, this was not the case in this History classroom.

The next section looks at the English teacher's use of digital technologies with the same Grade 9 class.

5.5.2.2 Appropriation of digital technologies in the English classroom

Like Natasha, Mariette was provided with an iPad by the school and her classroom is equipped with a data projector, a drop-down white screen and Wi-Fi connection. There was also a portable speaker on the teacher's desk. In our interview she said, *"I think the data projectors are brilliant. The fact that we've got internet access in the classroom is a brilliant thing"*. However, she stated that her lessons are more discussion based so she mainly used the available technologies to show videos, project memos or documents, and to do poetry readings. She said,

If there's answers that are gonna be easier for the children to jot down, then it's a document that we've typed up that we can now show them, really taking the place of the overhead projectors that we used to have. But also, we can do like poetry readings. There's

beautiful readings done of the poetry that we need to discuss, then they can hear a beautiful reading of the poetry.

Mariette also stated that she used to prepare some of her notes in PowerPoint and project them. However, this impeded interaction as learners focused on copying from the slides. This was therefore discontinued because learners did not find it helpful. Here is an extract from our interview:

Last year, actually, I used to have slides, like analysis slides that I would show them for the poems that we had to do, and then I found that they were so busy looking at what was written on the board that I couldn't do any discussing about the poem, like let me get your ideas about this part of the poem, and what do you think the poet means in this part of the poem, 'cause they're so busy looking at what's up and writing from that rather than getting engaged in the discussion. So, the kids actually said, can we just try an analysis without any slides as well because we'd like to hear you, but we also want to make notes? And really what I was just doing was pointing out the notes that were on the slides.

This comment suggests the need for training on how to use her iPad and data projector in a way that will enhance the lessons. In addition, when asked if there are other ways in which she used the technology in her lessons, Mariette responded, *"I don't actually know. I don't know what other technology could be useful. I don't know what else is available to me that I can make use of to make it better, and it feels like a gap"*. This confirms a lack of awareness of the affordances of the available technologies.

During the first lesson, she used her iPad with the portable speaker to play readings of the novel *The Hobbit*, which they were studying for literature. She explained that one of the learners suggested they listen to the readings of some of the chapters of the novel that are available on YouTube. One of the learners in this class used an iPad to access a downloaded copy of the novel, an example of the school's BYOD policy. Table 5.55 is an extract from the first lesson.

Table 5.55: Lesson 1: Literature—The Hobbit

Lesson 1: Literature—<i>The Hobbit</i> <i>Teacher 1; learners 2</i>

1. The teacher sits on her desk with her novel *The Hobbit* in her hand. Her iPad is on the desk from which the audio book is streamed. There is also a portable speaker on the desk. She has opted to stream Chapter 10 of the audio book from YouTube.
 - The teacher plays Chapter 10 of the audio book.
2. Learners listen attentively to the story while following in their books.
 1. The teacher pauses at various intervals to point out important bits in the story and ask questions to check that the learners are following the story.

The second lesson continued with the streaming of the audiobook from YouTube. Table 5.56 is an extract from the lesson.

Table 5.56: Lesson 2: Literature—The Hobbit (continued)

Lesson 2: Literature—*The Hobbit* (continued)

Teacher 1; learners 2

1. The teacher sits on the desk with the novel in her hand. Her iPad and speaker are on the desk from which the audio book is streamed.
 - The teacher tells learners to find the appropriate chapter and page in their novels.
 - She says get into reading mode and be ready to make notes.
 - She begins to play the audiobook from her iPad.
2. Most learners are ready to begin.
 1. The teacher plays the audio book, then pauses to check if learners remember details of previous chapters or check meaning of a word.
 2. One learner reads from her iPad.

The streaming of the audiobook allowed learners to engage with the novel via a mode other than verbal. The availability of technology as well as the accessibility of the audio text from the internet allowed for a diversity of experiences with the novel. However, Mariette was only able to find one other recording of *The Hobbit*, and as a result, she read some chapter herself or alternated the readings between herself and learners. One of the reasons she decided to read the text was a lack of engagement from learners. This will be explained further in section 5.5.3.3.

The only other occasion in which the teacher used her iPad and the data projector was to project an authentic example of an online book review onto the drop-down screen. Table 5.57 is an extract from the lesson.

Table 5.57: Lesson 7: Writing a book review

Lesson 7: Writing a book review

Teacher 1; learners 2

1. The teacher says that they'll be looking at an example of a typical book review.

- She realises that she doesn't have the remote for the projector, fetches it from another room, returns, and turns it on.
 - She pulls down the white screen, then connects her iPad.
 - She projects a book review of *Harry Potter and the Philosopher's Stone* onto the screen.
 - She then begins to read the review that's projected, then pauses to ask, "What is she missing? What 'punctuation wise' is missing in the first sentence?"
2. No learner responds.
1. The teacher asks again, "What has the reviewer not included in the first sentence to show that it's the title of a book?"

In this lesson, Mariette used the technologies available to show an example of a typical book review. This occurred after she had discussed the format of a book review, the number of words and issues like the ISBN number.

During the observed English lessons, Mariette used digital technologies four out of 12 times and mainly used media to transmit information and where the focus was on learning from digital technologies. In the lessons where the audiobook was used, the teacher's iPad and speakers were used to stream chapter readings from YouTube to present multimodal lessons. The data projector was used once to project content from the teacher's iPad onto the white screen. The use of digital technologies in this Grade 9 English classroom therefore exemplified media being used in a representative sense, harnessing the affordances of multimodality, accessibility and immediacy and diversity.

In summary, the observed use of digital technologies in the English and History classrooms in Southridge High School showed that media were being used in the representative sense to transmit information and not to generate knowledge. The focus was overwhelmingly on learning *from* the available technologies.

The next section examines the History and English teachers' pedagogical strategies.

5.5.3 Teachers' Pedagogical Practices at Southridge High School

5.5.3.1 *Patterns of interaction in the History classroom*

Natasha's Grade 9 History class can be characterised as passive, active learner participation appeared to have been discouraged, and tight teacher control was evident. This was in line with the principal's comment that he wants teachers to control the learning environment. One

example of this was during the sixth lesson. In the extract in Table 5.58 the teacher returned learners' test papers and read each question from the memo by giving the correct answer and spelling difficult words while the learners made corrections. One learner attempted to ask a question, and the teacher told him that she was not taking any questions until the end of the lesson. When she had finished going through the test memo, Natasha asked if there were any questions and then engaged with each learner individually, dealing with their specific issues. The others were asked to put their heads on the desk and be quiet. This lesson is an example of high teacher-student interaction, which was common.

Table 5.58: Lesson 6: Test review

Lesson 6: Test review <i>Teacher 1; learners 2</i> 1. The teacher tells learners to take out their books. - She returns their test scripts and tells learners to file them at the back of their books. - She tells them to take out their pens as she was going to go through the test with them. - She reads out each question and reads the answers as well. She spells difficult words and writes key words on the chalkboard. 2. Learners correct their work; some copy what she's saying. - One learner attempts to ask a question. 1. The teacher says that she's not taking questions until the end. - She continues to go through questions and their answers, which she reads from her memo. - After 12 minutes, she is finished and then allows for questions. - Learners who have queries are told to raise their hands. The teacher goes around to them individually to answer their questions. 2. Learners speak to the teacher quietly, and I'm not able to hear their questions. 1. THE OTHERS ARE TOLD TO PUT THEIR HEADS ON THE DESK AND BE QUIET.

High teacher-student interaction was first observed during Lesson 1 where the teacher recounted the conflict between Japan and America during World War II without allowing learners to speak. She started by giving a summary of Japan's atrocities during World War II and how they came into conflict with the Americans. She then spoke about Japan's invasion of China, the bombing of Pearl Harbour and the bombing of Hiroshima and Nagasaki. She spoke for 18 minutes without stopping to pose any questions or confirm understanding while learners listened attentively and made no comments.

In the second lesson, after streaming a YouTube video, the teacher recounted the information, at times reading from the handout, with minimal learner participation. She paused her reading to tell learners what keywords to highlight. This engagement is an example of her dominating classroom interaction. High teacher-student interaction occurred again in Lesson 7 as the teacher narrated a summary of the content in the handout while learners made notes. She highlighted what learners needed to study and focus on for the upcoming examination. Learner engagement involved one learner asking the teacher if she had made a summary of the notes and another asking if they could pass the examination by studying what she was telling them.

Although teacher-student interaction dominated classroom interactions, learners were given numerous opportunities to engage with content individually. Such interaction occurred when watching YouTube videos and completing the World War II worksheets. Multimodal student-content interaction with YouTube videos was seen in the first three lessons; although the first attempt was aborted as the internet connection was not stable. Natasha shared the view that using the available digital technologies to show videos was very useful for learners. She stated,

They respond well to visuals ... It certainly wakes them up. This generation of children have been on their smartphones since they were little or very young. So, it's what they know. And learning something off of a piece of paper or a book is a lot more dry and seeing it come to life. So, they do respond better when you show them something and I think they remember. Often when you're making a test, they will come up with things that they've seen rather than things they've read in a book.

Nevertheless, during observations there was minimal or no discussion around the documentary videos that were shown and most of the engagement occurred around the written curated notes that were distributed. For example, just after Natasha had shown the YouTube video, one learner asked “*What happens if an atom bomb lands in water?*” One learner suggested that a tsunami would occur. The teacher said, “*I don't know. I'm not sure*” and moved on with the lesson.

High student-content interaction with written text occurred during Lesson 4 as learners worked quietly on the World War II worksheet that was included in the term handout. The handout included all the content for the term's activities, including several maps, images, missing

information that learners had to complete and a comprehension text. There was low student-content interaction in the latter part of Lesson 6 when learners were asked to create mind maps as the planned activity had been concluded early.

In summary, Natasha's History class were characterised mainly by medium to low teacher-student interaction that happened mainly around written content from the handout. These were described as medium as Natasha dominated the classroom discourse and seemed to discourage learner interaction. This conflicts with her statement during the interview that "*class discussion is very much encouraged*". There was one opportunity for high student-content interaction when learners did the worksheet and another when they did a test. There was also low student-content multimodal interaction around YouTube documentaries. There were no opportunities for student-student interaction. In our interview Natasha explained that it is difficult to have any group or collaborative activity for the following reason:

If you're doing it in class that's fine but to send group work home is impractical because when are they supposed to get together as a group to collaborate after school hours? So ... aside from the odd interaction in class where they work in pairs, they generally work on their own.

There were also no examples of teacher-student-content interaction as learners were generally presented with information and not involved in negotiating meaning with the teacher.

The next section examines the enactment of the learning by design pedagogy in the History classroom.

5.5.3.2 Learning by design in the History classroom

For me, the most valuable thing that a child can leave school with is the ability to think for himself and herself and problem-solve and think critically and not just accept everything that you are told or that you read. So, a lot of the way in which we test the History, teach the History is through the means of analysis. Taking a cartoon, what is this person's point of view? How is their point of view obvious? So that they can see, they can start to identify bias... so that you are not sort of sucked into the world, that you go in with your eyes wide

open, that you can think, and in that way, with those critical thinking skills you are then able to problem-solve and apply your knowledge. You know, these kids have access to knowledge at the push of a button on their phones. They don't need us to fill them up with information. They need us to be able to teach them what to do with that information and that is to think about it and question everything.

Natasha expressed the above when asked about the importance of developing critical thinking and problem-solving skills and the need for learners to be able to apply their knowledge. However, the knowledge process that was prevalent in her Grade 9 classroom was conceptualising by naming. Despite her view that learners needed to be able to “*question everything*”, she rarely allowed learner questions or gave them the opportunity to share their views. The only opportunities provided for learners to apply their knowledge and demonstrate critical analysis were during their assessments. In the World War II worksheet in Table 5.59, although most questions tested content knowledge, the last two questions, “*In what way did that 1943 battle turn the Pacific war in favour of the US?*” and “*To what extent do you think the US practiced total war in the Pacific? Justify your answer*”, required learners to analyse critically and apply their content knowledge appropriately to answering the questions.

Table 5.59: The World War II worksheet

The World War II worksheet

What was the immediate cause of World War II?

What new military tactic (way of fighting) was introduced during the Polish campaign? Describe the tactic.

Explain the success of the Nazi invasion of France after 10 May 1940.

Describe Operation Dynamo.

How did the Germans attempt to force Britain to surrender in 1940? Describe that attempt.

What famous fighter aircraft helped Britain win the 1940 Battle of Britain?

What was the German attack on Russia code named and give the invasion date?

Describe and name the first major Russian over the Wehrmacht (January 1943)?

What were the D-Day landings of 6 June 1944? Briefly describe them.

What was the Sino-Japanese war (1937–1945)?

What actions of the Japanese in both the Sino-Japanese War and World War II demonstrated their commitment to the total War?

What was the main turning point of the Pacific war?

In what way did that 1943 battle turn the Pacific war in favour of the US?

To what extent do you think the US practiced total war in the Pacific? Justify your answer.

(45 marks)

Additionally, the cartoon analysis that was included in formative the History test included questions that required the appropriate application of knowledge from the class handout. Table 5.60 shows the cartoon and some of the related questions.

Table 5.60: Questions

Question 3 Examine the cartoons below and answer the questions that follow:  Cartoon A	Questions: Why are Nazi Germany and Soviet Russia sharing a bed? Explain why the little girl in the cartoon is surprised by this? How will this bed-sharing impact Poland?

Apart from the assessments, the History lessons mainly focused on the acquisition of content knowledge that needed to be remembered for the upcoming examinations. For example, during one part of the second lesson, Natasha read from the handout, paused to tell learners what to highlight and then posed the question “*What is an industrialist?*”. One learner responded, “*People who build a factory*”. The teacher added to the meaning, continued reading and paused occasionally to say what to highlight in terms of keywords, terms and important dates.

In Lesson 7 in Table 5.61, the teacher summarised the content in the handout, again highlighting what needed to be studied for the examinations. She provided a timeline of World War II events, summarised key events and places, and wrote keywords on the chalkboard. She also said which maps needed to be studied and how these would be presented in the examination. The focus was evidently on remembering names and information to pass the upcoming examinations.

Towards the end of the extract one learner asked, *“Ma’am, can you study this and pass?”* to which the teacher replied, *“No, but it would put everything in perspective so that you get a framework”*.

Table 5.61: Lesson 7: Review of notes

Lesson 7: Review of notes <i>Teacher 1; learners 2</i>	
1.	The teacher presents a summary of the notes, which were given to learners in their booklets.
-	She gives a timeline of World War II by first providing the date, then a summary of the key events and places.
-	She writes important names on the chalkboard.
2.	Learners copy as she reads out the information.
-	One learner asks the teacher if the teacher has a written summary of the notes.
1.	She responds no and then tells the learner that he has to make his own summaries.
-	The teacher continues to read from her booklet, answers questions about spelling and writes keywords on the chalkboard.
2.	At the end, one learner asks, <i>“Ma’am, can you study this and pass?”</i>
1.	The teacher replies no, then says, <i>“But it would put everything in perspective so that you get a framework”</i> .
-	She then says they need to study the maps and pictures.
-	She advises that they will get a map in the exam with the names of places blocked out. Learners will then have to write the correct names and say what has happened in that place giving dates.
-	She highlights what they need to study.

The lessons in which YouTube videos of the dropping of the atom bombs on Japan were shown were opportunities for learners to experience the devastation and the effects of the bombing, representing the knowledge process experiencing the new.

In summary, Natasha’s History lessons were dominated by the knowledge process of conceptualising by naming and focused on the acquisition of knowledge in preparation for the upcoming examinations. This is in contrast to her statement that *“they don’t need us to fill them up with knowledge. They need us to be able to teach them what to do with that information”*. While the assessments allowed for the appropriate application of knowledge and analysing critically, no opportunities were provided for these knowledge processes to be used during normal class activities. Additionally, the streaming of online documentary videos gave learners the opportunity to experience the new.

The next section looks at the English teacher’s pedagogical practices.

5.5.3.3 Patterns of interaction in the English classroom

Learners' individual desks and chairs were arranged in rows facing the board. The teacher's desk was at the front left of the class. The teacher generally sat on her desk and rarely moved around.

Of the 12 English lessons observed, 75% of the time was spent engaging with the literature text *The Hobbit*. The others focused on how to write a book review, the final lesson looked at language and another corrected review questions based on the novel. The dominant modes of interaction were teacher-student and student-content, with one instance of teacher-student-content interaction, which was observed in the first lesson. Table 5.62 shows an extract from the first lesson.

Table 5.62: Lesson 1: Literature—The Hobbit

Lesson 1: Literature—*The Hobbit*

Teacher: 1; learners 2

1. The teacher plays the audio book
 2. Learners listen to the story while following in their books. One learner reads from her iPad.
 1. The teacher pauses at various intervals to point out important information in the story and ask questions to check that the learners are following the story.
 - She points out what they need to keep in mind.
 - She asks, "Is this reaction fair?"
 2. Some learners say yes, others respond no.
 1. The teacher first asks those who say yes to justify their answers.
 2. Learners explain.
 1. The teacher affirms their answers; then asks those with a different opinion to provide justification.
 2. A learner responds
 1. The teacher adds, "That's a lovely justification".
 2. Other learners share their views.
 1. The teacher says we can look at this from both sides. She advises them to practice this when they look at justifications and argue their point fully.
- The word 'quay' is mispronounced in the reading.*
1. The teacher pauses the recording and points this out to learners. She then asks them for the correct pronunciation.
 2. A learner responds correctly.
 1. The teacher says, "It's like a pier". She then asks what is a pier?
 2. A learner gives an explanation which the teacher amplifies.

This extract is an example of medium teacher-student-content interaction as learners responded to the question "*Is this reaction fair?*" by sharing their opinion and justifying their responses.

There was also low teacher-student interaction as the class discussed the meaning of words and key aspects of the story and medium student-content interaction as learners listened to the story and followed the readings in their books while one of them read from her iPad.

The other lessons were mainly characterised by high teacher-student interaction and medium to high student-content interaction. The extract in Table 5.63 demonstrates this as learners listened to Chapter 10 of the audiobook.

Table 5.63: Lesson 2: Literature—The Hobbit

Lesson 2: Literature—<i>The Hobbit</i> <i>Teacher 1; learners 2</i>	
1.	The teacher resumes the audio then pauses to ask, “Tell me, which words create a creepy atmosphere?”
2.	A learner responds, “black”.
1.	The teacher affirms the answer, then adds, “Ominous”. She then asks, “What description does he give us?”
2.	A learner responds, “Dark smoke”.
1.	The teacher then asks, “What other sense does he appeal to?”
2.	“The sound of stony water.”
1.	The teacher then says, “He uses the words to create a dangerous, creepy atmosphere”.
-	She resumes the story.
1.	Another pause to ask, “What does the word perilous mean?’ Who can draw a conclusion based on what is going on?”
2.	One learner replies, “Dangerous”.
1.	The teacher affirms the answer then encourages learners to try to draw a conclusion even if they don’t know the meaning of the word.
-	She continues to play the audiobook, pausing at various intervals.

This lesson mainly focused on word choice and meaning to increase learners’ comprehension. It is also a demonstration of the initiation-response-evaluation sequence highlighted by Cazden (2001, cited in Cope & Kalantzis, 2015). Teacher-student interaction continued during the second part of the lesson when the teacher read Chapter 11 because she could not find an audiobook recording on YouTube. Learners were again very engaged as they discussed the sequence of events, and tried to understand the meanings of words, and to a minimal extent, the use of figures of speech and their effectiveness.

However, as the class progressed through the chapters, their participation in discussions and engagement with the story seemed to wane with teacher input dominating the discussions.

Consequently, there was high teacher-student interaction as Mariette focused on getting through the story, defining words and understanding the sequence of events. For instance, Lesson 3 occurred on a Friday, and since learners were scarcely participating, the teacher remarked, *“Let’s read on Monday. I’m full up”*, giving learners the remaining 17 minutes to relax. The next lesson was a double lesson and occurred the following Monday. The teacher resumed the reading from where she had stopped the previous Friday as the learners had done no reading at home. There was no change in learner participation as they scarcely responded to questions and when they did, they generally gave one word answers. This is the note I made during observations on that day: *“Learners are generally silent. They don’t seem to be engaging. One learner at the back of the class is doing Maths”*. The teacher was able to find an audio recording on YouTube of Chapter 12 and decided to play it instead of reading. There was no change in learner engagement, prompting the teacher to pause less frequently for discussions. The same pattern continued a few days later although one of the learners volunteered to read. Learners again had done no reading at home. By this time the teacher had grown impatient with the learners’ lack of engagement and pleaded, *“We are all getting tested on the same text. Can you please self-motivate?”* Later in the lesson the teacher decided to mark the review questions that learners should have done but most of the class had not done the task. The teacher then said, *“I need to see everyone’s answers ready to mark tomorrow”*. She added *“not to waste time, we have to go on”*, and continued reading with help from two other learners.

In the extract in Table 5.64, there is clearly more learner participation as they all took turns to read. This was evidenced by their responding to questions.

Table 5.64: Lesson 9b: The Hobbit

Lesson 9b: The Hobbit <i>Teacher 1; learners 2</i>	
1.	The teacher introduces the chapter then asks for volunteers to read.
2.	One girl volunteers and the teacher indicates that she’ll then choose who will follow.
1.	The teacher stops the reading at intervals to explain the meanings of words or ask learners to provide meanings of difficult words.
-	At one point she asks, “Who has joined the war?”
2.	The learners respond, “The goblins”.
1.	She then asks why, but there’s no response.

- She rereads the section with the information.
- 2. The class is then able to figure out the answer to the question
- Another learner reads.
- 1. The teacher asks, "The battle of five armies includes whom?"
- 2. One learner says, "The goblins and wolves".
- 1. The teacher says, "'The goblins were the foes of all'. What does that mean?"
- 2. A few learners explain.
- They are a bit off the mark.
- 1. The teacher explains the meaning of 'foe' and says that the goblins were the enemies.
- 2. Another learner reads.
- 1. The teacher repeats one of the lines, "so deadly was the wrath", then explains that the word 'wrath' means anger.

Learners were again more engaged with the discussion during Lessons 10 and 11 as they went through the final chapter of the novel. Mariette started to read since exams were fast approaching and there was still a lot of content to cover. Greater learner participation was also seen in the responses that were no longer one word but sentences and explanations. Table 5.65 is an extract from the lesson.

Table 5.65: Lesson 8: The Hobbit (final chapter)

Lesson 8: *The Hobbit* (final chapter)

Teacher 1; learners 2

1. The teacher tells learners that they still have some language to do before their exams so they have to move fast. She is going to start reading.
2. One learner takes out her iPad while the others take out their hard copies of the text.
1. The teacher gives the page number and starts to read.
- She reads, "I'm not one of the fallen heroes", then asks for the meaning.
2. One learner says, "He's not yet dead".
1. The teacher follows up, "If they've won the war, why the gloominess?"
2. Another learner says, "They've lost a lot of people".
1. "What's been happening all this time? Why can't he be seen?"
2. "He's invisible."
1. She asks, "What insight does Thoren come to at this late stage?"
2. A learner explains.
1. The teacher adds to the explanation.
- "What does it mean, 'the words stuck in their throats'?"
2. "They couldn't get the words out. They were emotional."

During the reading, the teacher highlighted difficult terms and words, asking learners to explain certain actions in the story. They also looked at the development of key characters in the story.

She also pointed out important sections that learners needed to take note of for their exams. Learners, especially girls, were engaged in the discussions and gave their responses.

The final lesson, which was a language lesson, was marked by medium teacher-student interaction with minimal learner response while the teacher quickly went through the language activities in the booklet. She read through the notes and the activities, mainly providing the answers as this was the last opportunity to go through the tasks before examinations commenced the following week.

In conclusion, Mariette's English class was dominated by high teacher-student interaction with the teacher unpacking the story to ensure learners were able to follow its sequence and know how the story unfolded. The teacher posed most of the questions and provided explanations while the learners, who on many occasions seemed to lack motivation, gave short answers and in many instances were not very involved in the story. The use of the audiobook for some of the readings did not contribute to greater learner engagement but provided another level of multimodality to the English lessons. Mariette made the following comment describing learners' engagement with the audiobook and her reason for reverting to the written text:

When I decided to revert back to us reading our novel, it was because I thought lesson after lesson they're coming, they're expecting just to sit and receive what this other person is reading to us off of this instrument, and I think that they're more engaged hearing each other's voices reading the book. So, at a point I decided no, that I'm gonna stop with the audio book and get us involved in the lesson again.

However, this did not improve their participation, which perhaps begs the question whether learner interaction was compromised because they could not identify with the characters in the story or the story in general? Or was it compromised because the lessons were largely monomodal?

Student-content engagement was observed in the reading of the novel or with learners' listening to the audiobook.

There was only one instance of teacher-student-content interaction, and opportunities for student-student interaction were not observed, although Mariette said the following in our interview:

I love to have them work together. I think they enjoy it more and definitely for that purpose of learning from each other cause I can see that there are points at which they teach each other: I remember this, I remember that.

The next section examines Mariette's enactment of the learning by design pedagogy.

5.5.3.4 Learning by design in the English classroom

Since Mariette's main focus during the period of observations was to ensure that learners complete the novel *The Hobbit* (knowing the plot, characters and important themes), the dominant knowledge processes were conceptualising by naming and with theory, and to a lesser extent, analysing functionally. The extract in Table 5.66 from the second lesson is an example of conceptualising by naming and analysing functionally.

Table 5.66: Lesson 2 The Hobbit

Lesson 2: The Hobbit

Teacher 1; learners 2

1. The teacher plays the audio book, then pauses to check if learners remember details of previous chapters or check the meaning of a word.
2. One learner is reading from her iPad.
1. The teacher resumes the audio book, then pauses to ask, "Tell me, which words create a creepy atmosphere?"
2. A learner responds, "Black".
1. The teacher affirms the answer then adds, "Ominous". She then asks, "What description does he give us?"
2. A learner responds, "Dark smoke".
1. The teacher then asks, "What other sense does he appeal to?"
2. "The sound of stony water".
1. The teacher then says, "He uses the words to create a dangerous, creepy atmosphere".
- She resumes the story.
- Another pause to ask, "What does the word 'perilous' mean? Who can draw a conclusion based on what is going on?"
2. One learner replies, "Dangerous".

1. The teacher affirms the answer, then encourages learners to try to draw a conclusion even if they don't know the meaning of the word.

They continue to listen to the chapter, pausing for discussion.

1. "What is a mason? What does a mason work with?"
2. A learner responds, "Stone".

The chapter comes to an end. The teacher reads the next chapter.

1. She continues to read then pause to ask questions.
 - She pauses again on several occasions not only to check comprehension but also highlight the use of figures of speech.
 - She asks learners to state the effect of the repetition of the word 'down'.
2. One learner says, "It gives an echo".
1. The teacher says, "I love that. I never thought of that".

While the process of conceptualising by naming dominated as evidenced in the definition of words such as 'perilous' and 'mason' as well as in the naming of descriptive terms, the question *"Who can draw a conclusion based on what is going on?"* required learners to draw inferences and use deductive reasoning. The question about the effectiveness of the word 'down' is also an example of the process of analysing functionally.

A similar blend of knowledge processes occurred during Lesson 10. Mariette started by reading, *"I'm not one of the fallen heroes"* and then asked what it meant. One learner responded, *"He's not yet dead"*. She then read the word 'gravely', and explained that it meant a very, very serious tone in his voice. Again, she read *"a rent armour"* and explained that rent meant torn or shredded. In these examples of conceptualising by naming, learners were not fully involved in the conceptualisation process as the teacher provided the answers. At the end of the extract, there was a change in knowledge process from conceptualising by naming to analysing functionally as the class briefly discussed the development of one of the characters. The teacher commented on the development of one of the characters in the story and asked if this was an accurate assessment and why? One learner responded, *"Before he was quite shy and scared and now he is brave"*.

There was another attempt at functional analysis to explore themes and character development in Lesson 11, which was not very successful. Mariette asked learners *"How is our story an example of coming of age?"* She then asked, *"What is coming of age?"* But there was no learner response,

prompting her to provide the answer. She followed up with another question about how the protagonist comes of age to which one learner responded.

In many of the other lessons, the focus was mainly on decoding the meanings of words during the reading, and hence, the knowledge process of conceptualising by naming. For example, in Lesson 4 in Table 5.67, the teacher read a sentence and then posed questions to check comprehension. If there was no response, she provided the response and continued to read.

Table 5.67: Lesson 4: The Hobbit

Lesson 4: The Hobbit <i>Teacher 1; learners 2</i> 1. The teacher says, "I'm going to read. Let's keep going as before". - She reads, then pauses to ask 'what' questions, often asking, "What do you think of ...?" or "What does that mean?" - She reads "He had a wicked and wily heart," then asks, "What does it mean?" 2. No learner response. 1. The teacher explains, then continues to read. - She pauses to ask, "What do you think of Bilbo's behaviour: brave; smart; stupid? Pupils what do you think of his behaviour?" 2. A learner responds, "Stupid". 1. She reads again, asks the meaning of the word 'kin'. 2. A learner responds, "Family". 1. She continues reading then says, "Your information is antiquated", then asks, "What does that mean?" 2. A learner responds, "Old".

After eight lessons focusing on reading the literature text, in Lesson 9 the teacher presented information on how to write a book review. Mariette read the information from *The English Handbook and Study Guide* and highlighted key points while learners made notes. This "little creative task" as the teacher described it was mainly for learners to be able to write a book review of *The Hobbit* to add to their term marks. The extract in Table 5.68 is an example of conceptualising with theory as learners learnt the formula for writing a book review. The task that was provided in a subsequent unobserved lesson required learners to apply their knowledge of book reviews appropriately to write a review of the novel.

Table 5.68: Lesson 9: Book review

Lesson 9: Book review

Teacher 1; learners 2

1. The teacher reads the information from *The English Handbook and Study Guide* while the learners copy what is said.
2. A learner asks if the review is like a blurb.
1. The teacher explains that it isn't even though part of it may read like a blurb.
 - After reading from the text and the learners copying the information, she says "Let's make notes about the different points that need to be included in Monday's task".
 - She writes the following words on the chalkboard: Title, author, price, publisher.
 - After writing each word, she pauses to ask questions and explain.
2. One learner asks if this would be in their exams.
1. The teacher says no but says it's just a little creative task.
2. The learner follows up by asking if it would count as part of their term marks.
1. The teacher says yes.
 - She continues by writing ISBN on the board and explains its purpose. She adds 'No of pages'.
2. A learner asks if the number of pages just includes the story.
1. The teacher responds.
2. Another learner then asks about the word count.
1. The teacher responds that their task will have to be between 160–180 words and makes a note on the chalk board.
 - She includes genre then asks, "What's the genre of *The Hobbit*".
1. A few learners respond, "Fantasy".

The final lesson was a quick language lesson as it was a few days before the end of term summative examinations and learners had not done any language activities. Language activities, which were in the learner booklet, included how to use apostrophes and how to use dashes and hyphens. Table 5.69 is an example of one of the exercises.

Table 5.69: Language lesson

Q: Identify whether the following apostrophes are apostrophes of possession (singular of plural) or omission.
Sarah's sister is dancing in the concert.
The girls' opinions were more sensible than those of the boys.
Randy won't be going to the party tomorrow.

This is another example of conceptualising with theory but with minimal learner participation and heavy teacher dialogue.

There was only one opportunity in the first lesson for learners to critically analyse what they read. This focused on providing justifications for responses. Having listened to a short segment of the audio reading, the teacher asked, "*Is this reaction fair?*" Some learners responded by saying yes and others said no. The teacher followed up by saying, "*Tell me why? Why is it justified?*". She then

asked for further explanations, which they provided. The teacher affirmed their explanations by stating, *“That’s lovely justification”*. She added, *“We can look at this from both sides ... argue this fully”*.

In summary, Mariette’s pedagogical approach was mainly observed in her frequent use of conceptualising, particularly by naming and with theory. There were very few examples of analysing functionally and only one opportunity for critical analysis. Learners also had one opportunity to apply their knowledge appropriately in their book review task. Learners’ seeming lack of motivation and poor responses impeded analysis and rendered opportunities for conceptualising with theory unsuccessful. In addition, examples of conceptualising by naming had high teacher input as she tried to complete the planned activities in preparation for the upcoming examinations.

In conclusion, the English and History classrooms were dominated by medium to high teacher-student interaction and the knowledge process of conceptualising. This was more evident in the History classroom than in the English classroom as learner participation was minimal, thus interrupting continuous classroom dialogue.

5.5.4 Teachers’ Perceptions of the 21st Century Classroom

The principal shared the view that human interaction is vital in any future classroom. He stated, *“The human side has a huge place in education. You know it’s not just about information. There also has to be the human value-add to the dispensing of teaching”*. This perspective echoes the principal of Duke’s College’s statement that human relationships are important. However, the use of the phrase *“dispensing of teaching”* indicate a more traditional view of education with an emphasis on transmitting information where the learner is the beneficiary of the knowledge being dispensed.

In regards the use of digital technologies, he expressed some scepticism and argued that *“when everything becomes digital then you’d start asking yourself why do we need then to go to school when we could all sit in front of a computer”*. The kinds of technologies he believed would be most used are IWBs, and he suggested that teachers would need to be upskilled to know how to

use them. However, he cautioned that *“your older teachers are not as inclined to use IWBs. They’re more inclined to use more simplistic tools like your iPads and then to be more animated in their explanations and use physical experiments”*. This belief that older teachers are more sceptical users of digital technologies was also expressed by the principal and Head of IT at Hampton High School.

Natasha, the History teacher, envisioned that the future classroom will be paperless with one-to-one laptop use and internet access. She stated,

In a perfect world, it would be ideal for every child to be sitting there with a laptop in front of them and access to the internet so that we can draw on all of those resources at the push of a button for everybody. And for them to be able to respond to work on a computer as opposed to writing it out by hand.

Mariette, on the other hand took, a wider perspective and argued that the current education system needs transformation since *“our whole system is still based on 1950s education”*. She added that while she is not certain what an ideal classroom would look like since she is *“limited by what resources can provide and what kids really, really need”*, but she argued, like the principal of Hampton High School, for smaller class sizes so that there is *“enough resources to make technology available at the fingertips of every student*. Technology should therefore not be *“something that only IT students get to have in a classroom”*. She made the following statement about what is needed:

An environment which is small enough and is equipped well enough for children to use equipment and to use apps and to use the internet in a way that makes learning relevant without taking it all away from the teacher, but you know, that the teacher becomes sort of a facilitator between what children need to know and the tools with which they are going to need to use to know these things ... That there is some communication between a child and a tool of technology instead of the same, this setup, of the classroom and the book and the pen and the paper. Because that’s not what is needed in the world that we’re entering in, in the 21st century.

Mariette's and Natasha's perceptions of the 21st century classroom demonstrated a divergence from those of the principal, who did not perceive teachers as facilitators but authority figures who need to control the learning. This indicates a lack of shared vision as it relates to the use of digital technologies and the overall perception of teaching and learning.

However, they all agreed that critical thinking is an important skill for learners to have in the 21st century. The principal included critical thinking with creativity and the ability to solve problems, which is needed for every subject, and Mariette placed the responsibility for critical thought on learners and expressed the view that *"critical thought is being able to have your own opinion but having it founded on something solid"*. Hence, learners needed to show her *"that they can think critically but also at the same time that it's not sort of a random thought"*. She cannot know if a learner can think critically if they do not voice their opinion.

Natasha linked critical thinking with problem-solving skills and stated that the latter is made possible by the ability to think critically. Combined with these skills is the need for learners to ask critical questions, although she did not encourage this in her lessons. She added that learners need to be able *"to identify bias"*, which speaks to the knowledge of analysing critically. She also felt that since learners had *"access to knowledge at the push of a button, on their phones. They don't need us to fill them up with information. They need us to be able to teach them what to do with that information and that is to think about it and question everything"*.

While Mariette viewed collaboration as an important skill, Natasha saw it as problematic as she was *"not big on group work"*. Mariette believed the following:

Children learn very well from each other, sometimes even better from each other than they do from a teacher. So, when time allows and a task allow, they will have the opportunity to do it together, even if, when we mark our work, we mark our individual work but I will say to them, 'sit with your friend in pair groups'. I don't do it bigger than that, it gets a bit messy, but sit together work through these questions together where one can't help the other".

The principal shared the view that creativity is *"a very, very vital skill"* in the 21st century. This includes *"being able to think differently and be able to seek out solutions from different spheres"*

and bring them into your space". He argued that it is important for learners to know that they are not limited by what is in front of them but can "link up with other mindsets and come up with something that's unique that might solve a problem in some way". This view suggests the need for collaborative problem-solving. However, he lamented that his school is constrained by the demands of the curriculum and the DoE, which prevents them from expanding their approaches and being innovative in terms of their curriculum. The school is thus "limited in terms of the extensive curriculum, the CAPS curriculum" because, according to him, a lot of content is being imposed on schools. This has a negative impact on teachers' ability to engage in detailed discussions with learners. He therefore mentioned that "discourse where you sit and interact and discuss things, there's not much time for that because of what's available and what the workload requires. So, the workload has increased from the days of outcomes-based education".

5.6 BAKER COLLEGE

5.6.1 Context

It is the second day of term 3. I arrive 10 minutes early for my first observations. I am greeted at the reception by one of the senior teachers who takes me to the atrium where learners and teachers from the College are gathered for hymn singing. The teacher whose class I am observing is playing the guitar. The atrium is a large, bright, recently built, rectangular space that is located between two rows of classroom. The roof is made of a type of glass that lets natural light in. At opposite ends of the space are cushioned seats for learners to sit. There are also circular tables with chairs around them. This is a space that learners use during their break and after school to relax, eat and work. I was later told that it is sometimes used for large group film viewings from the many television screens that are mounted on the walls. So, it's a multipurpose space in which the school's Wi-Fi can be accessed. At the far end of the atrium is a banner that reads 'Microsoft Showcase school'.

Baker College is a well-resourced monastic, private school in the northern suburbs of Johannesburg with a student population of between 380 and 390 learners and 36 academic staff. The College starts from Grade 7, unlike most other secondary schools that start from Grade 8.

Data collection included classroom observations of the same group of Grade 9 learners in their History and English lessons. The History teacher, William, is also the deputy principal of the College and had been in the position for five years prior to classroom observations. Lauren, the English teacher, who was the Head of the English department at the time, had been teaching at the school for 13 years. Both teachers along with Ilana, the principal, and Yvette, the Head of Innovation, Staff Training and IT services, formerly the Head of IT, were interviewed. The principal had recently been appointed at the school and had been in the position for only one term, whereas Yvette had spent 11 years at Baker College and had played an integral role in the College's technology procurement adoption and teacher training.

Teacher professional development is seen as an extremely important way of providing teachers with the skills necessary to enhance their practice; hence, the extension of the Head of IT's portfolio to include staff training. The principal stated that she is "*a big proponent of professional development and creating professional learning networks*". However, teacher training mainly focuses on developing teacher technology skills. This training, according to Yvette, has been ongoing and has evolved over the years. Initially, in-service training was done on an ad hoc basis. It then changed to voluntary 30 minute weekly sessions, and recently with the appointment of the new principal, training has become compulsory. Yvette referred to some of this training in the use of digital technologies as an "*ignite session*". These are interactive, hands-on sessions that introduce and familiarise teachers with new applications after which they can request more in-depth training if desired. Ignite sessions include coding, stop-go animation and any other trends Yvette consider important for the staff to know. Another important aspect of teacher professional development is the termly gatherings of educators from different schools to exchange ideas on the adoption of digital technologies in the classroom. I attended two of these sessions hosted by the school. The one involved teachers sharing ways in which they use digital technologies like Microsoft Teams to do vocabulary and other short quizzes.

One of the most significant changes that had been implemented recently at the College has been a change in the pedagogical approach. According to the William, the deputy principal, it has been bigger than the technological change. He stated that it has been *“a lot about differentiation in the classroom and innovative teaching that is not only technology based so rethinking how we teach”*. He added that it *“has been more about trying to move away from textbook based learning and to move towards less content more discussion, more critical thinking, teaching more thinking skills”*.

As part of its curriculum and pedagogical change, the College had recently implemented an out-the-box programme that Ilana described as *“an integration of different subjects and that really does offer a lot of opportunities for the students to use technology, to integrate technology in the learning process. So, it’s more a project-based learning”*. William noted that *“the thinking behind it is ... to push away from conventional pedagogy and look at how can we do things very differently [and] foster 21st century skills”*.

Yvette also mentioned that the out-the-box programme *“is supposed to be more like project-based learning where they pose a question and they work together in groups to solve the problem or come up with the solution”*. She added that it comprises digital and non-digital parts and is a combination of the traditional IT and technology subjects. Activities include website creation, coding and stop-go animation. In one of the activities, learners are required to create a 60 second stop-go animation on their iPads to protest gender-based violence. I had the opportunity to observe one of the gender-based violence animations at one of the TeachMeet sessions.

However, despite the implementation of out-the-box programme, William noted that *“the general classroom space really hasn’t changed. The only thing that really what we have is there is more dialogue among staff about subject integration”*. In his assessment of the programme, he observed that it had had varying success as *“there are some positive aspects to it but it hasn’t delivered quite what we want yet. We’ll tweak it for next year then we’ll have a full review in its third year”*.

5.6.2 Digital Technologies at Baker College

This College was identified as a Microsoft Showcase School in 2014, and thus, the use of digital technologies is integral to teaching and learning. Almost all the teachers have been trained as Microsoft Innovative Educator Experts. In fact, since digital technologies were first introduced in the school, there has been a concerted effort to accelerate the integration of technology with huge investments in training and the development of the IT infrastructure.

William, the Deputy Head of the College and History teacher, traced the technological improvements from having a “*a very simple smartboard*”. to having “*better infrastructure*”. Yvette, the Head of Innovation, Staff Development and IT Services, stressed the following:

Our school wouldn't work without digital technology now. It wasn't like that 10 years ago but now, without it, it's more than important. Because, without it, people I wanna say, can't teach. Ten years ago, they were like, why do we need this? Now, but the internet is down, I can't teach”.

Lauren, the Grade 9 English teacher described the period from 2014 to the present time as “*that sort of transition stage whereas now just about everything we use is obviously electronic*”. As part of this transition, all files that were until recently stored on a shared server are being migrated to the cloud. Ilana, the principal, stated that “*being a Microsoft Showcase School, we have the responsibility of actually driving technology in the learning process*”. She highlighted the importance of using digital technologies for teaching and learning but cautioned that it should enhance teaching and learning. In our interview, she mentioned the following:

Whilst I'm a huge proponent of using technology in the classroom, it needs to be there to enhance the learning and teaching. It is not there to drive the learning and teaching. So, teaching must still be able to take place and learning must still be able to take place as the teachers have planned the lesson. But where they can find technology which would enhance that learning and make it easier for the children to understand or to push them further or to introduce to them different ways of doing that, that's when the technology is very useful.

William said that the affiliation to Microsoft meant for example *“putting all our internal staff communication via Teams and putting all the documents from staff meetings on Teams instead of on a shared server”*. An example of this he said was that *“in the last year or so we’re moved from using Survey Monkey and Google Forms to using Microsoft Forms”* with *“some teachers who are for example using Teams to collect work, to mark work, to handle all communication with kids”*. He added that there are *“pockets of excellence and we are trying to leverage that to pull the majority”*. Nevertheless, he stressed that they are not taking full advantage of the Microsoft Suite and that they are *“on a journey in terms of Microsoft Showcase School”* and that *“each year we are making progress but it’s a long road ahead”*.

Although the school was designated a Microsoft Showcase School, it does not preclude it from using other platforms and applications from competitors. Rather, Yvette stated, they believe in *“the best tool for the job for the teacher”*. So, even though the school’s official policy is for each teacher to be given a Dell, windows-based laptop and for learners to have a windows-based laptop, iPads and Apple Macs were also provided for teachers who had to motivate for it. For example, *“the computer teacher has iPads, which they use for out-the-box lessons and for IT lesson [and] ... for other apps and things that are not available on the windows platform. ... There are a few other teachers like Accounting, one Maths, Business that have iPads”*. During one of the TeachMeet sessions I attended, I observed one of the out-the-box projects that had been done by learners in the College in which they had created a stop-go animation that dealt with gender-based violence. The Music department also had their own computer room with Apple Macs since according to the Head of Innovation *“the best tool to do music on is an Apple”*.

Yvette pointed out that in her view, one of the most essential pieces of digital technology for a school is the laptop because this is the device that is most frequently used for work. William also said that it is important for learners to use a laptop. He stated,

I’m a really big fan of our laptop programme. I’ve worked in a BYOD environment as well. And I think we do much more with our laptop programme. I think our laptop programme prepares the girls for university and the working world much more. They’re just familiar with the Office applications, connecting to networks, ... working with email, familiar with a lot of stuff that they’re gonna need. So, I’m a big fan of that idea. I think there’s the

biggest issue with the laptop is the portability, the clumsiness of it compared with tablets and smart phones ... The laptop enables you to create content as opposed to consuming content more ... On the laptop you can create more than the smartphone.

Nevertheless, apart from their laptops, learners are allowed to use their smartphones in class for pedagogical purposes but only if allowed by the teacher. However, this policy is not supported by all teachers. William made the following comment:

Our policy is currently pupils may not use their phones in the classroom without the permission of the teacher. And there's mixed feelings from teachers. So, some teachers want them banned, relatively few in number who use them. So, the policy is that they are allowed to use them with the teacher's permission.

Other essential pieces of technology for a school, according to the Head of Innovation, are a good smartboard and reliable wireless connectivity. Thus, she stated that “every classroom has Wi-Fi everywhere and every classroom has an interactive panel, which is like a touch interactive TV, 86 inch [Promethean smartboard]”. VR goggles had been recently acquired by the school but Yvette stated that teachers had not quite “bought into that”.

Despite the plethora of digital technologies and opportunities for training in their use, Ilana described their progress in the adoption of digital technologies into teaching and learning as follows:

I think that there are some teachers that have embraced it and are champions of integration of technology, and they're also the go-to people that other staff if they need help will lean on. I know for sure that it's not fully integrated in every classroom. I myself have done classroom observations of every staff member last term. So, I could see who are the ones who embrace it and who are the ones that are still doing the good old teaching style.

William shared a similar view to the principal and categorised teachers' integration of technologies into three groups: the champions; the middle group consisting of those who are slowly making progress in spite of time and curriculum constraints; and the third group who has continued to teach in the traditional manner. He argued that these champions, whom he also

referred to as early adopters, *“are fantastic at staying current with new applications that are out, with new ideas, and are implementing them in the classroom”*. However, he added that while there are great stories of digital technologies being integrated into individual lessons like in life sciences, *“it’s still a general level of traditional teaching enhanced in a more project kind of form, in a more isolated form where technology enhances it”*.

Yvette also referred to technology integration champions and mentioned one English teacher who *“has done things like introduce animation and got the other people in their departments to buy into it”*. Another champion mentioned is a Maths teachers who integrates digital technologies in her lessons in ways that are different from other teachers in her department. Yvette called this a *“a cross-pollination of champions who share and are willing to share with other people”*, but she cautioned that *“it’s a teacher thing [and not] a department thing”*. This confirms Ilana’s view that digital technologies are not fully integrated in every classroom.

Yvette further remarked that although there has been some change in the way teachers adopt digital technologies in their classroom and that *“overall our teachers are starting to think differently”*, it is a long journey with *“each individual teacher [being] at a different point of their journey”*. She likened it to *“changes in the SAMR [pronounced incorrectly] model”* where *“certain teachers have been through that stage and are right at the end stage where they’re actually thinking differently. Other teachers are still saying, ‘well, if I make you google something, I can tick the box that we use technology in the classroom’”*.

The following sections look at how digital technologies are appropriated in the History and English classrooms.

5.6.2.1 Appropriation of digital technologies in the History classroom

William’s History classroom, like the English classroom, was fitted with a Promethean IWB. The layout for both classrooms were very similar. Next to the smartboard on the front wall was a white board. At the front right of both classrooms was a large desk with a telephone, which allows the teachers to communicate with staff and the school reception. Most learners brought their

Dell laptops to every lesson. William was involved in many of the technological changes and as he stated in our interview, “when I started here, we were on a major IT drive”. He added,

When I got here, I had a very simple smartboard... it was a very simple one and the standard of the equipment wasn't nearly as good. So, there's been a drive to provide better infrastructure and to do some engagement with ... how technology could enhance learning.

William had also been involved in continuous learning activities in the use and integration of digital technologies as the school provide weekly training on different technology trends and applications. This suggests a general knowledge of the various affordances of the different technological tools available to him.

During the period of observations in William's Grade 9 classroom, digital technologies were used in eight of the nine lessons observed. This mainly involved the use of his Dell laptop and the Promethean interactive white board to show curated lesson notes, to stream YouTube videos and to access images from the internet. There is evidence of William's use of technology to stream YouTube videos in Table 5.70

Table 5.70: Lesson 1: Discussion of political events prior to the first democratic elections in South Africa

Lesson 1: Discussion of political events prior to the first democratic elections in South Africa

Teacher 1; learners 2

Towards the end of the lesson.

1. Having discussed some of the events leading up to the end of apartheid, the teacher says that to give learners a sense of what was going on during that time, he is going to play a video from *The Bang Bang Club*.
- *The Bang Bang Club* movie trailer is streamed and projected onto the smartboard. The girls turn off the lights and pull down the window screens, then watch the video attentively (2 minutes).

Lesson 2:

Beginning of the lesson.

1. The smartboard is powered up and the teacher turns on his laptop.
- Notes from the handout are projected onto the smartboard.

Towards the end of the lesson.

1. The teacher streams a You Tube video for five minutes from his laptop onto the smartboard about the Kempton Park World Trade Centre invasion in 1993 by the AWB (Afrikaner Weerstandsbeweging)

supporters during the time when current president Ramaphosa and Roelf Meyer, among others, were in discussions.

At the end of the video a learner says, “This is so deep”.

In the excerpts in Table 5.70, William accessed short video clips from the internet to give learners an experience of the events that led up to the 1994 elections in the country. This was possible because of the easy accessibility of the video content on the internet, which enhanced the lessons that were dominated by verbal interaction with multimodal content. This activity was not used to generate conversation but to convey emotion, as William stated in the interview. The videos also added to the diversity of texts and knowledge sources in the lesson afforded by the accessibility of the internet. However, technologies were used in the representative sense as the focus was on learning from technology.

In the extracts in Table 5.71, technology was again used in the representative sense to access and show lesson notes, project a clock timer, and access stock images from the internet that were projected onto the interactive white board.

Table 5.71: Lesson 3 Political events prior to first democratic elections

Lesson 3

Teacher 1; learners 2

Beginning of the lesson.

1. Notes from Unit 8 are projected onto the smartboard and the class resumes a discussion about the events that led up to the end of apartheid.
 - The discussion basically focuses on what was in the notes and projected onto the smartboard.
 - The teacher then projects images from the first democratic elections onto the smartboard.

Lesson 4

1. During a 20 minute spot test, the teacher projects a clock timer onto the smartboard from his laptop.

Lesson 5:

1. The teacher turns on the smartboard.
 - He asks learners to take out their notes from the previous day.
2. Some learners enquire about their final History exam. He says, “Let’s not worry about the exam right now”.
 1. The History notes about Zimbabwe are projected onto the board from the teacher’s laptop.
 - During the lesson, the smartboard, which was idle for some time, switches off. The teacher goes to the laptop and says, “wake up”.

And later: The discussion shifts from Zimbabwe to old colonial and apartheid statues and if they should be taken down.

1. The teacher first shows a cartoon of the #Rhodesmustfall issue and afterwards an image of the Voortrekker monument on the smart board.

A lengthy debate ensues about whether statues should be removed.

Lesson 7: Zimbabwe

1. Smartboard is on. The teacher projects the MS word handout on Zimbabwe from his laptop onto the smart board.
 - He asks learners to take out their notes on Zimbabwe. Says they will complete Unit 3 today.
 - He recaps the last lesson and reviews key terms that came up in that lesson.

In these extracts, the affordance of accessibility was harnessed to project notes that learners were given. There was therefore no functional change nor benefit to the lesson with the projection of the notes. However, the images of the #Rhodesmustfall cartoon and the Voortrekker monument generated a lot of debate. So, although they were used in a representative sense, the discussions that the images evoked were generative. The use of images added a visual text to the lesson, helping make the lesson multimodal.

Learners in William's class also used their Dell laptops; although this was not a frequent occurrence since he only allowed them to use their devices as he said, *"when the lesson determines. Otherwise, I find it distracting for the girls. I don't think they should have them just to take notes and so there's a very inconsistent experience as well"*. During Lesson 9, learners were allowed to use their laptops and the Wi-Fi to conduct research on Zimbabwe. The girls used Google to conduct their search. Most of them typed the information they found into their laptops. In one instance, William suggested to one learner that she should use pen and paper to make notes, to which she replied, *"I prefer laptops"*. During that lesson one of the learners tried to charge her smartphone on her laptop and the teacher did not permit her to do so. This illustrated the following statement from the interview:

My biggest issue with the smartphones is that their whole personal life is on the phone. When you are now trying to use it for teaching and learning, up come all the notifications ... and you can struggle to keep them focused. With the laptop, you've got more control. This is a business tool. This is a teaching and learning tool.

This comment by William suggests that unlike laptops, smartphones are not good pedagogical tools. Table 5.72 is an extract from that lesson.

Table 5.72: Lesson 8: Zimbabwe

Lesson 8: Zimbabwe <i>Teacher 1; learners 2</i> 1. The teacher starts by telling the girls to get their laptops out and to try to connect to the Wi-Fi because they are going to be doing research on Zimbabwe. - “You’re going to do a bit of research and get more information on Zimbabwe.” - “You will discuss with the person next to you, then we will have a larger discussion at the end.” - “Are we connected to Wi-Fi?” - The teacher then projects the questions for research on the board and explains further. 2. Nineteen of the 20 girls have their laptops. The one without a device shares with her partner. 1. The teacher walks around to assist those who have problems connecting to the internet. 2. One learner takes out her phone which she starts to charge on her laptop. 1. The teacher tells her to put it away as it’s not phone time. <i>Within 5 minutes all learners are connected to the Wi-Fi. They use Google to do their research.</i> <i>And later in the lesson:</i> 2. In one group, one of the girls is typing on her laptop. 1. The teacher tells her she can use pen and paper. 2. The girl responds, “I prefer laptops”. <i>Most of the girls are typing their responses on their laptops. One pair writes in their notepad.</i>

During the continuation of the lesson, the teacher projected the research questions onto the smartboard and some of the girls used their laptops to access the notes from the previous day. Technology was again used in the representative sense.

In conclusion, digital technologies in William’s History class were only used in representative forms by both him and the learners and the focus was on learning *from* technology. Despite continuous teacher learning in the use of digital technologies, the interactive capabilities of the smartboard were not used, and it was instead used as a presentation tool and an extension of a whiteboard. In fact, the pedagogical affordances were rarely harnessed, and only the technological affordances and capabilities such as presenting, projecting and typing were used. There were no examples of generative use of media during the nine History lessons observed. However, during our interview William stated that he would love to use more digital technologies in his lessons “to elicit responses from pupils who do not participate in a vocal forum”. He added, “we can use an app and the idea is that we pose them a question and it’s a silent debate and we participate in this debate on a Twitter style feed but anonymous”. However, he is constrained by

a lack of time. Nevertheless, the following comment by William clearly indicates knowledge of the pedagogical affordances of the available technologies:

One thing that I've wanted to do, again, this is that function of time, is to use more technology to elicit responses from pupils who do not participate in a vocal forum ... So, this is where ... And we can see, the idea is that we as teachers can see that everyone there is participating but we give pupils a voice who don't necessarily, who won't feel comfortable in an adolescent space, which is often dominated by some very strong opinionated characters, and there's other ... dynamics at play that this girl over here that this girl over there will not necessarily put up... So, I do think that there's a place and I think that can be used very effectively in terms of getting more participation in the classroom [from] those who don't necessarily participate.

The next section looks at the appropriation of digital technologies in the English classroom with the same group of learners.

5.6.2.2 Appropriation of digital technologies in the English classroom

In regards to Lauren's adoption of digital technologies, she said, *"It's really just using laptops and the Promethean boards really, and then sometimes the kids using their laptops. We don't really use anything else"*. Of the 11 lessons observed, she used the smartboard and her laptop during five of them to project lesson notes and hyperlinks. She also uploaded files onto the school server, which was still being used, as well as emailed documents to learners. Table 5.73 shows some examples of her use of technologies.

Table 5.73: Lessons 1 & 3b: How to write a literature essay

Lessons 1 & 3b: How to write a literature essay <i>Teacher 1; learners 2</i> 1. A mind map in Microsoft Word on how to write a literature essay is shown on smartboard. - The teacher goes through the information in the mind map. Lesson 2: How to write a literature essay 1. The teacher recaps what was done during the previous lesson. She projects the mind map onto the smart board and continues to highlight common problem areas and emphasise areas that learners need to work on, like topic sentences. Lesson 2 (continued): <i>Twelfth Night</i>

1. The teacher distributes booklets containing information about the play *Twelfth Night* and introduces the play, which learners had watched at the end of the previous term.
 - She asks, "Tell me honestly, when you were introduced to the play and watched the movie, how was it?"
2. Some learners respond: "It was boring. It was confusing".
1. The teacher projects a video link of a summary of the play onto the smartboard. She promises to send the link and says it's on the server for learners to watch in their own time.
 - She says that she'll use the DVD at times to help learners get a sense of what's happening.

Lesson 3b: Literature—*Twelfth Night*

1. The teacher projects the page with the task on the smart board. She points out that one of the links requires you to pay for some of the information. She then adds that she'll send them another link.
 - Later, she tells them that she has emailed them a link

Lauren's use of the smartboard to project notes and hyperlinks indicate the representative use of digital technologies. These examples of representative use of digital technologies continued throughout the observations in Lauren's English class. Apart from projecting lesson notes onto the smartboard, Lauren frequently referred to emails sent to learners. The use of emails afforded the sharing of numerous classroom resources. In Lesson 8, she referred to an email document that gave more details about sonnet forms and she advised learners that if they're keeping everything electronically, they need to save it in a file. She then said, "*If I were you, I would print it and keep it in a file*". This statement demonstrates Lauren's preference for emails instead of digital copies of documents, which she expressed as follows in our interview:

We use email a lot. So, we email them tasks. And then if we feel that we need to we would then print a hard copy. So, we will say for example, we're setting an essay, we will introduce the essay in class and we will have emailed everything to them electronically and we might just print the task sheet but perhaps all the notes and rubrics, and everything else that goes with them is just emailed to them and then you might have, embedded in the document various hyperlinks that they've got to go and access or look at or whatever. So, we do try to cut down on printing costs, but we find that practically, it's a bit of a pain.

Lauren's preference for emails and hard copies was also shared by the English department as she stated,

We also tend to, as a department, still all mark things in hard copy form ... So, they might submit something electronically but then we'll still print it out and mark it in hard copy. So, we're not really annotating and marking things in an electronic form".

She said some learners also prefer the hard copies of documents in order *"to annotate on whatever the thing is or take their notes on the thing itself or in the play as opposed to doing things on the screen"*. Additionally, although they had the option to buy digital copies of books, most learners opted not to buy the e-books, prompting the English department to revert to hard copies of texts.

Lauren's belief that there is a *"very important connection between writing and understanding and recalling and memorising"* could also be a barrier to her integration of digital technologies despite continuous training and access to technologies. Her comments demonstrate that although teachers and learners have access to the Microsoft Teams platforms, the affordances are not being leveraged to upload, share and store documents. This would have minimised the frequent sharing of documents, files and hyperlinks via email. Instead, some files are still being stored on the school's server, which was still in use.

Learners in Lauren's Grade 9 English class mainly used their laptops and the technologies available to them in class to access lesson notes and other resources shared by the teacher via email. They occasionally typed their assignments, but as she noted in our interview, hard copies were preferred.

In Lesson 1 during their poetry writing task, some learners typed their poems on their laptops while the others wrote in their examination pads. During Lesson 3, learners were tasked with researching the similarities between Elizabethan women and contemporary women as part of their *Twelfth Night* assignment. Some of the links they needed to access were included in the booklet, which was also projected onto the smartboard. Learners were able to access a diversity of texts and sources of knowledge to enhance their learning. The extract in Table 5.74 shows how the learners used digital technologies for this task.

Table 5.74: Lesson 1: Poetry writing task

Lesson 1: Poetry writing task <i>Teacher 1; learners 2</i> - Two learners seated in front with a laptop open are discussing their poems. - Another learner is passionately reading her poem to three others who listen and share their opinions. - The teacher checks the poem of another girl and offers some guidance. - Four other learners type on their laptops. The others write on their exam pads <i>At one point six laptops are taken out and used at different times.</i> - One learner quickly checks something on her smartphone. Lesson 4: Twelfth Night <i>Teacher 1; learners 2</i> <i>Task: Learners' task is to find out and write down the similarities and differences between Elizabethan women and contemporary woman based on information found in the links provided.</i> - The teacher projects the page with the task on the smart board. She says one of the links requires you to pay for some of the information. She then adds that she'll send learners another link. - Learners begin working in their groups. Some use cell phones, others laptops to search for information online, which they then share with the others who write in booklets and on sheets of paper. - The ones using their devices search for information on Google, which they discuss with other group members. <i>Group 1: 3 on laptops; 1 on cell phone</i> <i>Group 2: 1 use cell phone; the rest write on paper</i> <i>Group 3: 1 use cell phone; 1 on laptop</i> <i>Group 4: 3 use laptops; 1 on cell phone</i> - The teacher tells learners that she has emailed them another link. - She walks around and checks on each group.

Although the learners encountered challenges when connecting to the Wi-Fi, they quickly accessed the internet from their smartphones and used their mobile data to conduct their research. This was of concern to the teacher who worried that there was no firewall protection for learners who used their data to access Google Chrome. The extract in Table 5.75 shows how that section of the lesson unfolded.

Table 5.75: Lesson 3 continued

Lesson 3 continued <i>Teacher 1; learners 2</i> - The teacher speaks to the learners who are using their phones asking, "Tell me, is it easier to use your phones?" "Yes." - Another learner replies, "'cause it's so slow".

- Some learners indicate that they can't connect to the Wi-Fi. (A few of them have managed to connect using their laptops)

1. The teacher asks, "Then are you using your data?"

I'm not able to hear the response but it seems like they are.

1. The teacher ends up sharing her laptop with one of the learners.

The teacher tells me about her concern that when learners use their phones, there is no firewall, whereas with their laptops, there are firewalls that protect learners. She indicates that this was a particular concern when learners use Google Chrome.

2. Learners continue to discuss and search online.

Slow internet resulted in some frustrations and slight delays in the activity. During our interview, Lauren shared her frustration about how the lesson unfolded and the lack of firewall when learners use their phones to access sites via Google Chrome. She said the following:

For example, when you were here last week or the week before, I deliberately asked the girls to bring their laptops because I wanted them to access things, articles online and then obviously a number of them didn't bring their laptops because they said that they take too long to connect. And then some of them used their phones instead, but then others said that they didn't want to use their phones because they didn't want to use their data. So that sort of a lesson becomes frustratin, because I ended up having to get kids to share devices and then some of them aren't equally involved, and then I was lending my laptop to one person.

For this reason, she mentioned the following:

Usually, we download the things beforehand. It can sometimes be intermittent, particularly depending on how many users there are on. What the connection is like. So yes, I've tried to stream it like videos or DVDs before but it's not ideal. It's better to download it.

Lauren also preferred if learners refrain from using their mobile phones for pedagogical purposes. She stated the following:

Technology can be very distracting for them. So, I know that cell phone policy has been a big bone of contention over the years. And different teachers, in different classes have different policies in terms of that. You know, lots of kids are distracted by their cell phones and do try to use them in class and similarly, their laptops. So, they might have their

laptops up and they're supposed to be taking notes or whatever, and then actually, somebody who's walked past your classroom and seen through the window then tells you that they're doing this or they're communicating with somebody else in the lesson via some or other social media app or whatever it is.

Another way in which learners used digital technologies is to access study resources and complete language activities online. The teacher frequently suggested that learners use SparkNotes, an online study resource, to supplement their literature studies. During Lesson 7, Lauren set a few tasks for learners using SparkNotes and Digibook. Digibook is an online independent study material or a digital workbook to reinforce language content from *The English Handbook and Study Guide*. The website states the following:

Digibook is a digital workbook with hundreds of questions and answers designed to reinforce the language content of The English Handbook and Study Guide. It's like a workbook, only better. It gives you instant feedback. You can access it online anywhere at any time. (<https://digibook.co.za/faq/>).

It allows both synchronous and asynchronous learning. Their task was to revise parts of speech and use SparkNotes for a literature activity. The accessibility of these sites because of continuous internet access provided opportunities for learning from the available technologies as well as afforded access to other sources of information apart from written texts. The online task also provided recursive feedback on learners' performance.

Although learners' use of digital technologies was more extensive in the English classroom than in the History classroom, their use was still mainly for representative purposes with little or no functional change to their tasks. The SparkNotes and Digibook activities helped to enhance learning but can still be classified as representative. Nevertheless, although the use of digital technologies for the task researching the differences between Elizabethan women and contemporary women was for representative purposes, the subsequent debate and discussion can be viewed as generative as learners used the information they found to generate detailed and critical discussions on the topic.

In conclusion, digital technologies in William's and Lauren's classrooms were used in a representative sense and not to generate knowledge. The affordances of diversity, accessibility and multimodality were generally harnessed. However, despite the unique learning opportunities and the affordances offered by the versatility of the interactive white board, continuous access to Wi-Fi and access to laptops as well as access to Microsoft Teams learning platforms, the technological capabilities and affordances were mainly harnessed.

The next section explores teachers' pedagogical strategies in both the History and English classrooms.

5.6.3 Teachers' Pedagogical Practices at Baker College

This section explores the History and English teachers' pedagogical practices by looking at the patterns of interaction and the enactment of the learning by design framework in the classrooms.

The period of observations at Baker College was marked by many disruptions that very negatively influenced learners' interactions and conversations. Nationally, there was outrage over the recent assault and murder of a University of Cape Town student as well as two other young women in the country. Several schools were holding public demonstrations protesting the issue of femicide and violence against women. However, Baker College did not get involved in these public protests at the time when other students and some of the girls were becoming increasingly frustrated as they disagreed with the school's position. Additionally, the school had previously organised a huge campaign to highlight the plight of the African rhino and there was the large statute of a rhino on the College campus, which learners felt was inappropriate at the time. Thirdly, the former principal of the school passed away after a long illness during the latter stage of observations.

5.6.3.1 *Patterns of interaction in the History classroom*

William's Grade 9 classroom was characterised by a blend of modes of interaction and the dominant modes were teacher-student and teacher-student-content, which were generally at a high level. While there were several opportunities for student-content interaction, these mainly

occurred at a low level with only one example of medium student-content interaction. There were even fewer examples of student-student interaction, and only one occurred at a high level.

A blend of modes was observed from the first lesson during which there was high teacher-student interaction interspersed with low teacher-student-content interaction and low student-content interaction. In the extract in Table 5.76, the teacher began the lesson by recapping information that was learnt in a previous lesson. He then posed a series of questions, such as “*Who was the newly elected president?*” or “*What do you call it when people don’t go to work?*”, to engage learners and to check their understanding of the content and concepts. After hearing their responses, he affirmed their answers, elaborated and continued to pose questions, seeking clarifications of learners’ answers. In short, the teacher posed questions that led to discussions. One of the discussions centred around the xenophobic attacks in the country and the fallout from the violence. This represents a brief episode of teacher-student-content interaction as learners were able to link the general issue of boycotts to the current situation in the country.

Table 5.76: Lesson 1: Political situation in South Africa 1990–1994

Lesson 1: Political situation in South Africa 1990–1994

Teacher 1; learners 2

1. The teacher sets up the lesson by telling learners that they will move forward with the end of apartheid. He will show a video at the end of the lesson if everything works out.
 - He directs them to their notes in their handouts about the end of apartheid.
 - He begins by recapping the political situation between 1990 and 1994 leading up to the end of apartheid after Mandela was released.
 - He says that there was a lot of protest then asks what else was going on.
2. One learner responds by saying that the government was using force.
 1. The teacher asks, “Who was the newly elected president?”
 2. A learner responds, “F. de Klerk”.
 1. & 2. They continue to discuss the strikes and overall context.
 1. The teacher asks, “What do you call it when people don’t go to work?”
 2. Learners respond, “Strike”.
 - Another learner states that there were sanctions against South Africa.
 1. The teacher asks, “What are sanctions?”
 2. Three learners respond.
 1. The teacher affirms the answers, then refers to workers’ protest in the 1980s.
 1. & 2. A discussion ensues about P.W. Botha and immorality.
 1. He then says, “So, we’ve got internal protests, we’ve got external boycotts,” then asks, “What are boycotts?”

2. One learner says, "When people refuse to buy stuff".
1. The teacher adds, "That's economic boycott. Any other boycott?"
2. "Sporting boycott."
1. & 2. The teacher and learners then discuss the current xenophobic attacks and upsurge of violence in the country and the reactions of some African leaders not to participate in the World Economic Forum meeting in Cape Town in protest.
1. The teacher then tells learners that there were some suggestions that South Africa should be kicked out of the upcoming Rugby World Cup.
2. The learners express their shock.
1. & 2. A discussion between the teacher and learners ensues

William summarised the information about the political situation in South Africa from the 1990–1994 period in a mind map that he drew on the whiteboard. Towards the end of the lesson there was a brief period of student-content interaction as learners watched a YouTube documentary (mentioned in section 5.6.2.1) made by *The Bang Bang Club* that showed some of the violence that occurred during the period of transition. The teacher told learners that he wanted to give them "*a sense of what was going on*" during that time. This is one of the instances in which learners were given the opportunity to interact with audiovisual content. In our interview the teacher stated,

I use a fair amount of video, particularly to convey emotion. When we want to get a sense of emotion and that happens in a way, which is very hard to get across in a traditional way. So, I think it can be very effective in drawing pupils in particularly on that emotional level. And I think it does impact their enjoyment of the subject to some point ... So very often if I show a video clip that is quite high in emotional content, it will feed a very rich discussion thereafter, which is not always as easy to create otherwise.

There was minimal discussion after the video but learners were asked to chat with their parents about their experiences and recollections about this period in South Africa's history.

Teacher-student interaction where the teacher introduced new information and content as well as posed questions as a means of guiding the learning was also dominant in the second and third lessons. In the second lesson, William continued the discussions about the events immediately leading up to the first democratic elections in South Africa and the negotiations and violence that occurred. He used a similar strategy to that used in the previous lesson where he reviewed what was taught previously and then asked questions of learners to test how much they remembered.

Towards the end of the lesson, learners were given an opportunity to provide feedback from their discussion with their parents about their experiences during the period. The teacher then streamed another YouTube documentary showing the invasion of the World Trade Centre at the time of talks between the African National Congress and the National Party. One of the girls commented that *“the subject was so deep”* to which a few others agreed. After watching the video, the girls listened attentively as the teacher shared his own experience as a young boy during that time, and by the end of the lesson, the girls were visibly disturbed with the same learner again commenting *“it’s so deep”*, providing evidence of the teacher’s interview comment that videos *“can be very effective in drawing pupils in particularly on that emotional level”*. This was another example of low student-content interaction.

One of the topics explored in the History class was the subject of Zimbabwe. In Lesson 4, before speaking to the notes in the handout that was distributed, the teacher wrote the word ‘xenophobia’ on the white board and said, *“Let’s unpack this word for a little bit”*. He then added, *“Zimbabweans living in South Africa are often the target of xenophobia”*. This led to medium-high teacher-student-content interaction as the class discussed the issue. Since half of the lesson was devoted to a spot test representing low to medium student-content interaction, the subsequent discussion in which learners were very engaged is described as medium to high interaction as Anderson’s (2003) model defines high interaction in terms of time spent on the activity.

During Lesson 5, there was evidence of multiple patterns of interaction ranging from medium to high teacher-student-content interaction to low teacher-student interaction and low student-student and low student-content interaction. The teacher showed a poster on the smartboard that read *“An African cannot be a foreigner in Africa”*. Learners were asked to comment on the sentiments expressed in the poster. Table 5.77 is an excerpt from the lesson.

Table 5.77: Lesson 5: Xenophobia

Lesson 5: Xenophobia

Teacher 1; learners 2

1. The teacher asks, *“Do you agree with this poster here? ‘An African cannot be a foreigner in Africa’”*. He notes that one of the learners is wearing a necklace with an African symbol and points out that *it’s a contravention against school policy but then quips that she’s probably wearing it because of today’s discussion and is making a statement about pan-Africanism.*

1. He then repeats the statement, then asks, "Agree or disagree?"
2. Some learners say agree.
 - One says, "You can be an African but it's just foreign land".
 - "I think in terms of African people, you can't be, but you can still breach a country's sovereignty."
 - "But you can still be a foreigner to the country, but you aren't exactly a foreigner."
 - "So, it says, an African cannot be a foreigner in Africa. Let's say a Nigerian is still in Africa and cannot be a foreigner in South Africa."
1. So, the teacher says that this brings in the concept of pan-Africanism. He then writes the word on the white board.
2. & 2. A long discussion ensues after which the teacher returned to the topic of pan-Africanism.
1. He then asks, "What does 'pan' mean?"
 - He continues, "It means across". He writes the word on the white board then explains what the term Pan-Africanism means and when the idea started.
 - He adds that the idea of African supersedes the national identity or tribal identity.
 - He then refers to former President Thabo Mbeki who advanced his idea of pan-Africanism.
 - He then said that a lot of these ideas haven't really taken root as xenophobia is the opposite of pan-Africanism.
 - He spoke about the African Union and recent trade deals signed by the President.
 - The teacher then said that he wanted frame the discussion in light of them the conversation about xenophobia.

The lengthy debate about whether an African can be a foreigner in Africa is an example of high teacher-student-content interaction as learners debated the issue and shared their views. The teacher's explanation of the concept of pan-Africanism represents a period of low teacher-student interaction. After the discussion about xenophobia, the focus of the lesson shifted to Cecil John Rhodes and the issue of statues from the past. In another example of teacher-student interaction, William spoke briefly about the scramble for Africa and the discovery of gold as a way to introduce the next task. Learners were then asked to analyse a Zapiro cartoon commenting on the #Rhodesmustfall movement. They did this in pairs, in groups of three and one group of four while one learner worked on her own. This example of low student-content and student-student interaction saw learners largely working together to make sense of the cartoon and explore the questions in their handouts.

There was further evidence of high teacher-student and teacher-student-content interaction during Lessons 6 and 7. Lesson 7 focused on land reform, a very topical and emotive issue. The class had a general discussion on the issue after which the teacher read a News24 article published in 2018 exploring Zimbabwe's land reform policies. William said, "*Let's define some*

terms here”, and discussed terms like ‘opportunistic’ to ensure that learners understood the task that they had been given. Learners worked individually to answer three questions on the topic before getting together in groups of three and four to discuss their responses. These were examples of student-content and student-student interactions, but both were at a low level.

The only evidence of high student-content interaction occurred in Lesson 8 and involved the use of technology as learners generally worked in pairs to conduct online research on Zimbabwe.

Table 5.78 is an extract from the lesson.

Table 5.78: Lesson 8: Zimbabwe

Lesson 8: Zimbabwe <i>Teacher 1; learners 2</i>	
1.	The teacher approaches the group sitting in front of me and points out that they haven’t made much progress.
2.	They resume working.
1.	He says to another group, “You’re getting somewhere”.
-	He says to one group that seems to be having problems, “Google something like ‘land reform in Zimbabwe’”.
-	He cautions against dense, long academic articles.
-	He walks around to each group and guides them.
-	He says, “You can’t just randomly click on links. You can’t always trust Wikipedia.” But he says, “If you’re really struggling, look at Wikipedia but you don’t rely on it as a source. You can’t quote from it”.
2.	All of the girls are busy working now.
-	They research for about 30 minutes.
1.	The teacher says, “Let’s do a little bit of debrief then we will continue”.
-	He starts with the first question.
2.	One learner reads their response.
-	Another reads theirs.
-	Two other learners read.
1.	The teacher then says, “Let’s pull it together”.
-	He elaborates, then asks about compulsory acquisition: “Some of you were having a problem with it”.
2.	Another learner reads what they have written.
1.	The teacher then asks, “Who wants to add?”
-	After another incorrect response, the teacher says, “This has nothing to do with land reform. This is a random definition”.
2.	Another gives their definition.
1.	The teacher remarks, “You’re giving me a cut and paste answer”.

In Table 5.78, it is evident that some learners were having difficulty conducting research online and finding the right sources as evidenced by the teacher’s comments and his advice against

using Wikipedia as a legitimate source. Later as they were having a debrief, the teacher remarked that one group was providing *“a cut and paste”* answer.

In conclusion, William’s interactive and questioning style allowed learners to be engaged throughout their lessons. Multiple patterns of interactions in the History classroom were used with teacher-student and teacher-student-content interactions occurring most frequently and at a high level. There were opportunities for learners to interact with each other on tasks as well as work individually on tasks, but these were infrequent and very short. Hence, student-student and student-content interactions were generally low, except for the one lesson of high interaction where learners conducted online research in pairs.

Regarding the way learners interacted with technology, William stated in his interview that *“they enjoy a multimedia approach [and] ... when we are providing different media and I think it does engage the pupils more”*. He also said that *“the technology stuff can be great, a great way to stimulate discussion”*. However, he emphasised that *“a lot of kids, even if we don’t have the technology, will engage very well”*. He further stated, *“they respond and engage better with subjects and with teachers who are, at least attempting to do stuff and who are engaging with them on a different level”*.

Despite both teachers and learners having access to digital technologies at Baker College, including access to various technology applications that afford interaction, opportunities for active knowledge making and numerous other action possibilities, interaction in William’s Grade 9 History classroom was mainly passive and less transformative. The interactive capabilities of the smartboard were not used as interactions occurred largely around written text and dialogue between the teacher and learners, with some opportunities for visual and audiovisual content interactions.

The next section examines William’s pedagogical practices using the learning by design pedagogical framework.

5.6.3.2 Learning by design in the History classroom

We're talking a lot about differentiation in the classroom and innovative teaching that is not only technology based so rethinking how we teach. So, the sort of change in pedagogical approach has been more about trying to move away from textbook based learning and to move towards less content, more discussion, more critical thinking, teaching more thinking skills.

This is William's comment on the pedagogical approach at Baker College. His History classroom reflected a blend of knowledge processes. From the first lesson it was clear that the teacher tended to weave between pedagogical strategies to help learners understand and experience the events leading up to the first democratic elections in South Africa. The frequent questions asked of learners was a strategy to revise important names, events and terms. Questions like "*What else was going on?*", "*What are sanctions?*" and "*What are boycotts?*" exemplify conceptualising by naming, a feature of overt instruction. To understand the issue of a boycott and its consequences, William referred to the recent incidences of xenophobia in the country and the decision by some African leaders to withdraw from the World Economic Forum meeting in protest. The class then discussed whether the country should be 'kicked out' of the Rugby World Cup as a result of these attacks. This example of experiencing the known was a way for learners to have a greater understanding and situating the discussion in a familiar and current issue. At the mention of protests, one of the learners raised the issue that was of importance in the girls' lifeworld, the recent femicide in the country. Table 5.79 is an extract from the conversation with the learners.

Table 5.79: Lesson 1b: Discussion about boycotts

Lesson 1b: Discussion about boycotts

Teacher 1, learners 2

1. & 2. The teacher and learners discuss the current xenophobic attacks and upsurge of violence in the country and the reactions of some African leaders not to participate in the World Economic Forum meeting in Cape Town in protest.
1. The teacher then tells learners that there were some suggestions that South Africa should be kicked out of the upcoming Rugby World Cup.
2. The learners express their shock.

A discussion ensues.

2. A learner then asks the teacher about the plan for women to stay away from work the following day in protest against the recent femicide. She then asks, "What do you think about that?"
 - Another learner responds, "We've got a test tomorrow".
1. The teacher says he feels despondent about the situation, and together they discuss the situation regarding gender-based violence.

A few minutes later the lesson resumes.

1. The teacher draws a simple mind map on the white board as the discussion focused on the events leading up to the end of apartheid.
 - He writes 'internal', 'external', 'F.W. De Klerk' and 'collapse of communism'.
 - He add that the learners haven't studied the Cold War yet, then asks, "What do we understand by communism?"
2. Learners try to give their opinions, but it's incorrect.
 1. The teacher explains, writes 'equality' under 'communism' and speaks about inequality in South Africa.

The discussion shifts to land redistribution.

2. A learner asks, "What if you worked for that land?"
 - Another one asks, "If someone builds a company, how can you take it away?"
 - Yet another learner speaks about the Zimbabwean land situation.
1. The teacher then asks should we be taking ownership from the rich and give it to people, for example, in Diepsloot?
2. The learners unanimously respond, "Yes".

After discussing the issue of gender-based violence and the school's seeming lack of response, the discussion returned to the events leading up to the end of apartheid, and the teacher drew a mind map that included key concepts and terms. This was a shift in knowledge processes from experiencing the known to conceptualising by naming as the teacher clarified a learner's misconceptions about communism.

At the end of the lesson, to help learners experience the mood leading up to the first democratic elections and to witness the violence of the time, the teacher shifted modes by leveraging the accessibility of the internet to stream a short documentary video. The showing of the video reflected another pedagogical shift back to experiencing but this time experiencing the new. At the end of the lesson, to deepen their experience of the situation in the country at that time, William asked learners to speak to their parents about their experiences and memories of that time.

The second lesson unfolded in a similar way with the teacher weaving between the knowledge processes conceptualising and experiencing, but most of the lesson focused on presenting information and new content, hence on conceptualising. A few learners shared their parents'

experiences during the period of transition in the country, and the teacher also shared his experience as a teenager. Learners then watched a documentary video of violent disruptions to negotiations between one of the anti-apartheid leaders and a member of an Afrikaner resistance movement.

The strategy of harnessing learners' prior knowledge and referring to current affairs was again observed in Lesson 3. During the discussion about the referendum on ending apartheid, there was a brief reference to the Brexit referendum. This strategy of experiencing the known as a way of getting learners to experience and understand the unknown was often used. To give the sense of the enthusiasm on the day of the first elections, the teacher showed images of the long queues of people waiting to vote. Table 5.80 is an extract from the lesson.

Table 5.80: Lesson 3: Discussion of events pre-1994

Lesson 3: Discussion of events pre-1994

Teacher 1; learners 2

1. The teacher explains that even though the apartheid government felt that it was democratic, others felt that it was a dictatorship. He adds that De Klerk called a referendum and explains what it is. He then asks, "Have you heard of this before?"
2. The learners say, "Yes, Brexit".
1. The teacher gives some historical background into Brexit.
2. One learner asks what is the difference between Great Britain and the United Kingdom?
1. The teacher explains, then returns to the subject of South Africa.
 - He says that the referendum was only conducted among whites.
2. One learner asks why.
1. The teacher says that only whites were allowed to vote.
 - He gives more details about the referendum and shares his personal experience as a high school boy during that time.
 - He continues to discuss and explore the events pre-1994.
 - He speaks about the violence in the hostels and Chris Hani's death, concessions with the IFP [Inkatha Freedom Party] and land given to the Zulu king.
2. The learners listen and make notes and at times ask questions of clarification.

The discussions basically focus on what was in the notes and projected onto the smartboard.

1. The teacher then projects images from the first democratic elections onto the smartboard.

The use of multiple pedagogical strategies was also observed during Lessons 4 and 5 when the topic shifted to Zimbabwe. In our interview, William stated, *"We've changed a lot of curricula based on what pupils have said. Pupils have said we want to learn more about African countries. So, we've introduced something on Zimbabwe that we would never have taught in Grade 9*

before". Since the subject was based on learners' interests and recommendations, they were very engaged in the discussions. William began Lesson 4 by writing the word 'xenophobia' on the white board and asking learners what the word meant. The class began to unpack the meaning of the word, which is an example of conceptualising by naming but with the learners involved in the process of conceptualisation of meaning. As the class delved deeper into incidences of xenophobia, the learners started to analyse critically as the teacher asked them to be more specific with their examples and asked questions like "*How does xenophobia play out?*" and "*What else do you see?*". One learner referred to the recent boycott of a South African cell phone provider in Nigeria in retaliation for the xenophobic attacks. This discussion continued the following day with the teacher showing a poster that read "An African cannot be a foreigner in Africa". Learners were asked whether they agreed with the statement. The debate that ensued is an example of critical analysis of the poster with learners referring to their prior knowledge to make sense of the statement. Table 5.81 is an extract from the lesson.

Table 5.81: Lesson 5: Zimbabwe

Lesson 5: Zimbabwe <i>Teacher 1; learners 2</i> 1. The teacher projects a poster which reads "AN AFRICAN CANNOT BE A FOREIGNER IN AFRICA", then asks, "Do you agree with this poster here? An African cannot be a foreigner in Africa". - He then repeats the statement then asks, "Agree or disagree?" 2. Some learners say agree. - One says you can be an African but it's just foreign land. - Another learner says, "I think in terms of African people, you can't be, but you can still breach a country's sovereignty". - "But you can still be a foreigner to the country but you aren't exactly a foreigner." - "So, it says, 'an African cannot be a foreigner in Africa'. Let's say a Nigerian is still in Africa and cannot be a foreigner in South Africa. 1. The teacher then says that this brings in the concept of pan-Africanism. He then writes the word on the white board. - He then asks, "If this was a European, can a European be a foreigner in Europe?" 1. A few learners say no. Some say yes. 1. The teacher continues, "Someone who is French if they are in Germany, are they a foreigner?" 2. "Yes." 1. The teacher continues, "Between France and Germany there is no physical border ...". - He then asks, "Are you still a foreigner or is Europe open for all Europeans?" 2. "I feel like it's different countries so you can be a foreigner. An African can be a foreigner in Africa."

1. The teacher then says it comes back to an identity issue. "What's more important? Our identity as Africans as whole or our identity as a country, as South Africans, or Zimbabweans or Nigerians?"
2. One learner says, "I don't necessarily think that you can be a foreigner from Africa in Africa because these foreign lands and the separation of the lands were not separated by us".
 - Some learners seem shocked while some say, "Yes, she's right".
 - She continues that before colonialism people could go from North Africa and come down and not be considered foreign.
 - Learners begin to argue as some disagree.
1. The teacher interjects and says, "LET'S UNPACK that a bit because it's not entirely true".

In the extract in Table 5.81, learners were deeply engaged in the conversation while being guided by the teacher's questions, which led them to explore different points of view. This mix of experiencing and analysing contributed to a richer discussion. After the debate, William tried to refocus the debate by discussing pan-Africanism and explaining the concept of pan. This explanation of the concept of pan-Africanism indicated a shift from analysing critically to conceptualising by naming. This move was evidenced with the teacher presenting information on the scramble for Africa, the discovery of gold in South Africa and the history of Zimbabwe, including Cecil John Rhodes and Rhodesia. William concluded the discussion by emphasising that he wanted to frame the discussion in light of their conversation about xenophobia.

There was another shift to the process of analysing critically during the fifth lesson after the teacher showed a cartoon of the #Rhodesmustfall protests and an image of the Voortrekker monument, asking the following questions: "*Should we tear down his [Rhodes] statue?*", "*Who should we have statues of?*" and "*Who should be included in our history?*" After first discussing in groups, another class debate ensued. One learner commented that there are no statues of Hitler hanging around Germany and one group stated that they had mixed feelings. While they acknowledged that Rhodes was part of history, they didn't agree that he deserved a statue. They felt that it should have been in a museum rather than in a public space since it felt like he was being glorified.

While there were numerous examples of conceptualising by naming, analysing critically and experiencing the known and new in William's History lessons, opportunities for learners to apply their knowledge were observed during a spot test testing knowledge of concepts such as referendum and requiring them to apply said knowledge to critically analyse questions such as "Did the white population vote 'yes' because they believed it was morally correct? Explain your

answer by using your own knowledge”. The group internet research task required learners to apply their knowledge and information found in their search to answer questions on land reform in Zimbabwe. Other examples of applying appropriately occurred in the many class debates.

William’s History lessons were characterised by rich discussions and debates where he applied a mix of modes of interaction as well as knowledge processes, combining experiencing, analysing, and conceptualising with fewer examples of applying. The frequent opportunities for learners to apply their lived experiences and prior knowledge in the classroom and the freedom to raise issues of concern indicated that their epistemological diversity was being valued. More importantly, William’s statement in our interview that the topic of Zimbabwe was introduced into the curriculum because learners stated that they wanted to learn more about African countries demonstrates that there is some learner agency at Baker College and that learners’ interests are being valued.

5.6.3.3 Patterns of interaction in the English classroom

In our interview, Lauren stated, *“I don’t use technology to the same extent as some other people do”*. She added, *“I still expect there to be a huge amount of verbal communication and discussion. I don’t want people to be hiding behind their laptops. I want them to be involved and engaged”*. Consequently, interactions in the English classroom generally did not use digital devices and were mediated by the teacher with sustained verbal interactions between her and the learners.

While there were opportunities for student-content, student-student and teacher-student-content interactions in Lauren’s classroom, medium to high teacher-student interaction was dominant. This was observed particularly as new content was being presented as part of the literature studies. Medium teacher-student interaction was observed in the first lesson as learners were being taught how to write a literature essay using examples from learners’ essay writing. The teacher first read from the notes that were projected onto the smartboard then referred to errors or good examples, all the while involving learners to read an example from their writings and using a mind map that was projected onto the smartboard. This activity continued in the third lesson when the teacher following the same process. After giving extensive feedback she summarised the elements of a well-structured essay.

The literature lesson in Table 5.82 is another example of high teacher-student interaction.

Table 5.82: Lesson 7: Twelfth Night reading and discussion

Lesson 7: *Twelfth Night* reading and discussion

Teacher 1; learners 2

1. The teacher outlines the context of the play, and speaks about the characters, the setting and themes to take note of.
 - She mentions that one of the themes is the tyranny of love, then asks learners to state what comes to mind when they think of the words 'tyrant' and 'tyrannical' and what 'tyranny' means.
2. The words 'struggle', 'difficult', 'painful' and 'heart wrenching' are mentioned.
 1. The teacher then speaks about the conflict between reason and passion or emotion, logic vs intelligence, etc.
 - The teacher writes key words on the board and as they discuss the themes, she adds to the whiteboard.
 - She then asks, "Where do we see behaviour like this in the play?"
 2. One learner refers to the shift in one character who is first ruled by reason and later by emotion.

There's more discussion on the difference between reason and passion for about 2 minutes.

1. The next theme discussed is disguise and deception, and the teacher asks learners to explain the words disguise and deception in their own words.
2. The learners offer synonyms, which the teacher writes on the whiteboard.

In the extract in Table 5.82, the teacher started the discussion by outlining the context of the play and speaking about the setting and important themes. She mentioned one theme, tyranny of love, and asked the meaning of the word 'tyranny'. Learners aptly defined the word and together they discussed other themes. These discussions were interspersed with questions to confirm learners' understanding, after which there were more in-depth discussions around the themes. She commenced reading the play and gave slightly longer explanations. A similar pattern of interaction occurred the following day during Lesson 8 when the teacher read parts of the play and paused for discussions and to highlight important aspects, including the theme. Teacher-student interaction continued when the class unpacked the meaning of words like 'pragmatic' and the teacher noted keywords and phrases on the white board. The teacher made a deliberate attempt to include learners who were not participating in the class discussions. In this way, she ensured that everyone was included in the interactions.

In some lessons, there was a combination of teacher-student interaction and student-content interaction. Low to medium interaction was observed in the first part of Lesson 1 as learners created their own poems. This task had been started prior to classroom observations and learners

were completing the task during that lesson. Some learners worked outside on the grass and others remained in the classroom. This activity was not for marks, but the best ones were going to be put in the school's yearly magazine. Some learners read their poems to their friends to get their perspectives. One learner also asked the teacher to check her poem.

Low teacher-student interaction with high student-student interaction was observed in the fourth lesson. The class first discussed the plot and sub-plot of the Shakespeare play, followed by the teacher outlining the task. Low interaction between the teacher and learners was followed by high student-student interaction, which was very rare in Lauren's English classroom. Learners worked in groups on the assigned task and used technology to search for information. Learners divided the tasks, and some conducted the internet search on their devices before discussing it with other members of the group who made notes. Unlike the History class, they were allowed to use their smartphones in the English lesson, which meant that the lesson was not impacted by the slow Wi-Fi. Table 5.83 is an extract from the lesson.

Table 5.83: Lesson 4: Group research task

Lesson 4: Group research task <i>Teacher 1; learners 2</i> 1. The teacher adds, "What I would like you to do now is to get into your groups, turn and face each other, push your desks together as you will be writing". - The learners are slow in getting into groups, which they had chosen during the previous lesson. There are three groups of five and one group of four. <i>The task: List similarities and differences between Elizabethan women and women today in the two columns, based on the information you found in the links above. The two headings are Elizabethan Women and Contemporary Women.</i> <i>Links to sites about the role of women in theatre during the time of Shakespeare are included.</i> 1. She gives learners 20 minutes or until the end of the lesson and they will chat tomorrow. - She states that she expects everyone to get involved in the discussion and says they all need to contribute as she will be assessing participation. 2. Learners begin working in their groups. Some use cell phones, others laptops to search for information online, which they then share and discuss with the others who write in booklets and on sheets of paper. - The ones using their devices search for information on Google, which they discuss with other group members.

The different sites used by learners were suggested by the teacher and provided multiple sources of information for the task.

The subsequent lesson where learners provided feedback from their internet research was characterised by medium teacher-student interaction and medium teacher-student-content interaction. The learners first presented information they found online, and the teacher posed questions seeking clarification on and justification for what was being presented. She provided explanations when these were not sufficient and affirmed responses. The extract in Table 5.84 shows the teacher-student-content interaction as learners engaged in debate.

Table 5.84: Lesson 5: Differences between life for Elizabethan women and contemporary women

Lesson 5: Differences between life for Elizabethan women and contemporary women <i>Teacher 1; learners 2</i> 2. The learners are very engaged and are all participating in a very lively discussion. <i>The discussion on the issue of forced marriages and patriarchy continues for a few minutes.</i> 2. One learner suggests that marriages were arranged to ensure that status was preserved within a certain group. 1. The teacher affirms the comment, then refers to the reality show <i>Survivor</i> where contestants form alliances to increase their power for their benefit. 2. One learner states that society is still male dominated where males hold the most powerful positions. Women are beginning to get positions of power but they are not as powerful. - One of the girls shifts the conversation to high beauty standards, where lighter skin was more desirable. 1. The teacher offers further explanation of the learner's points. She then asks if the preoccupation with paler skin is still a problem today. 2. One girl says, "It's a bit different because white girls want to be darker, that's why they tan and some Black girls bleach because they want to be paler". <i>The discussion continues with reference to stories seen on social media in SA society and Michael Jackson.</i> 1. The teacher follows up. "Do you think we just want what we don't have or is it more than that? Let's hear your thoughts." 2. "Society doesn't know what it wants," says one learner who blames the marketing industry for helping to create the desire for the perfect image. - Another girl says that it has to do with some cultures and what they value. - Yet another learner says that it has to do with our history. She refers to apartheid and Hollywood where white is desirable, where lighter skin is more desired. - Another says it has a lot to do with our mindsets and our mindset is set by how the media first shows us example. The perfect Black girl is not too dark or the perfect white girl is 'tannish'. 1. The teacher then says she's going to allow three more girls to speak on the issue. She then allows those girls who haven't contributed to the discussions to speak.

Learners' comments were lengthy as they engaged with the issues. The teacher deliberately engaged learners who had not contributed to the discussion, allowing for greater participation.

Medium teacher-student interaction in Lesson 5 was followed by medium to high teacher-student-content interaction as learners connected with local and global issues and interrogated issues such as patriarchy, power and other issues of concern to women. Learners were very engaged in the discussions with the teacher and posed leading questions to extend the discussions. This interaction are further analysed in section 5.6.3.4.

The poetry lesson during the ninth lesson was also characterised by the use of multiple modes of interaction. It included student-content interaction, teacher-student-content interaction and teacher-student interaction as the class discussed the structure of a sonnet. Lauren used a different strategy to get learners to make sense of the structure of a sonnet. Learners first read the sonnet in their handouts, which they had difficulty comprehending at first. The teacher then gave them one minute to make notes about the structure of a sonnet based on what they were taught the previous year in poetry. After this brief student-content interaction, they discussed what they had written. Table 5.85 is an extract from the discussion.

Table 5.85: Lesson 9: Poetry

Lesson 9: Poetry Teacher 1; learners 2	
1.	The teacher tells the girls that if they were in her class the previous year, they would have heard her speak about sonnets, including the structure of a sonnet, etc.
-	She also says that those who were in another class might have done the same.
-	She then says that for 1 minute they need to make a list of everything they know about a sonnet, being guided by the poem in front of them.
-	If they never learnt about sonnets before, they need to work out the structure; for example, if the poem is in stanzas or have a rhyme scheme, and try to make sense of it.
2.	Learners work individually for 1 minute.
-	Some learners have called up the poem on the laptops while others work from their worksheet.
1.	The teacher then asks, "What can you deduce without being taught?"
-	She first asks, "How many lines a sonnet contains".
2.	One learner says, "14," which a few of them already knew.
1.	She then asks, "What else can you tell me?"
2.	Another learner responds that a line has 10 syllables.
1.	The teacher affirms the response then says, "It's a requirement to be able to work out metre".
-	She then asks, "What is metre?"
2.	A learner responds.
1.	The teacher then gives a detailed explanation and writes on the white board.
2.	Learners makes notes.

- One says, "There's a specific rhyming scheme," then asks, "What is it?"

Together the teacher and learners continue to work out the structure of a sonnet with the teacher asking questions and guiding learners in their responses.

In the extract in Table 5.85, after learners had written everything they could deduce about the structure of a sonnet, the teacher posed several questions eliciting their responses without offering any assistance. In the end, they were able to correctly identify aspects of the structure in a guided student-content engagement. This was followed by low teacher-student-content interaction as they continued to add more information about structure. The teacher then showed learners how to work out the metre or patterns of syllables; an example of teacher-student interaction.

Lesson 10, another poetry lesson, featured medium teacher-student interaction and student-content interaction as the class discussed poetic devices, figures of speech and how to analyse a poem. Learners worked individually to analyse a Shakespearean sonnet in their handout.

Other opportunities for student-content interaction with technology occurred when learners used Digibook and SparkNotes for tasks assigned for when the teacher was going to be absent. These tasks were not observed. The first task for which they were required to use SparkNotes required them to work in groups "*to go through and make sense*" of the remainder of one of the scenes from *Twelfth Night*. Learners were also required to use SparkNotes to construct character sketches and make study notes. The only synchronous student-content activity that was done during the teacher's absence was the synchronous use of Digibook for revision exercises to revise aspects of language.

In conclusion, there were numerous examples of a blend of modes but also of high teacher-student interaction with the active participation of learners as they made sense of the Shakespeare play *Twelfth Night*. The teacher frequently guided the learning process by presenting information and involving learners in deducing meaning of word and concepts and confirming understanding. However, the less frequent modes of interaction were teacher-student-content and student-student. Additionally, there were opportunities for learners to individually interact with digital technologies, but the collaborative opportunities that ubiquitous

access to technologies afford were not harnessed. The interactive capabilities of the smartboard were also not used.

The next section looks at the enactment of the learning by design pedagogical framework in the English classroom.

5.6.3.4 Learning by design in the English classroom

In our interview, Lauren highlighted the importance of critical literacy in the teaching of English. She stated, *“We have to be able to equip our learners with the ability to be able to think and analyse and interrogate and question”*. She added, *“You look at things like bias and you look at attitude and you look at tone and you look at what the agenda is of the writer and how they’re trying to manipulate you”*. The first example of critical literacy occurred during the second lesson when she was introducing the Shakespeare play *Twelfth Night*. She outlined the merits of continuing to study these works and told learners that they’ll be surprised and horrified at what they discover, and that although we’re in the 21st century, things haven’t really changed for women. She added that learners needed to be aware of the situation of women both locally and globally. She then stated that the play deals with gender identities, and asked, *“Is that still relevant today?”* This led to an animated discussion about the recent issue of femicide in the country and the perception that their school was not addressing the issue adequately and instead focused on the plight of rhinos. This discussion is in Table 5.86.

Table 5.86: Lesson 2: Introduction to *Twelfth Night*

Lesson 2: Introduction to <i>Twelfth Night</i>	
Teacher 1; learners 2	
1.	The teacher distributes booklets and introduces the play which learners had watched at the end of the previous term.
-	After a brief discussion, she adds that at the moment Shakespeare is still on the syllabus and says that there’s still merit in studying his works although they were written a long time ago.
-	She tells learners that they’ll be surprised and horrified at what they discover. That although we’re in the 21 st century, things haven’t really changed for women.
-	She says that they need to be aware both locally and globally about what’s happening with women.
-	The play is looking at gender identities, and asks, <i>“Is that still relevant today?”</i>
2.	Most of the learners respond by saying yes.

- Another expresses her concern that although gender issues are topical, the school seems to spend too much time focusing on rhinos.
- Yet another exclaims, "There are schools marching right now!"
- 1. The teacher says that the rhinos have been dying for a long time.
- 2. A learner responds, "So have we. It's now that it's coming to light!"
- One girl shouts, "I think all of you are wrong because at 3:30 today there is a class that's debating the issue".
- 1. The teacher points out that the learners are right to be concerned but assures them that the rhino campaign had been planned for quite a while. She also said that activities were being planned to protest against the killing of women.
- She adds that the girls are privileged to be at a school like this that highlights awareness of issues such as discrimination and gives them opportunities to talk about it. She encourages them to go out and make their voices heard.

This brief teacher-student-content exchange demonstrated how engaged learners were about issues in their society and how they were able to make connections between issues in the Shakespeare play and their own lives. This is an example of critical literacy as articulated by Janks (2013), where literacy is connected to students' lived experiences. Additionally, although the text *Twelfth Night* seemed alien to the learners' lived experiences as it is set in the Elizabethan era, Lauren immediately related it to the learners' interests, and in this way she used known experience to make sense of a new context.

During the fourth lesson the learners were given the task to research the similarities and differences between women in the Elizabethan era and contemporary women. This allowed for the use of multiple knowledge processes, including experiencing the known and the new, conceptualising by naming and analysing critically. Learners first presented their findings, which formed the basis of questions and discussions. These discussions drew on their lived experiences. They debated the issue of the marriage transaction, in particular the dowry system, and drew comparisons with the lobola system in South Africa. Male dominance and power were also interrogated along with patriarchy. Learners also critically reflected on the role of social media, the marketing industry, history and how apartheid created the view that lighter skin is better. The knowledge processes that were used in the latter discussion combined the knowledge processes of experiencing and analysing. Furthermore, the task of comparing the Elizabethan women era with women in contemporary society helped learners to experience the new and gain

an insight into an unfamiliar society by referring to issues of culture and power in their own lifeworlds.

The knowledge processes of conceptualising by naming and with theory as well as analysing functionally were evident in the lessons focused on the analysis of poetry and the study of the Shakespeare play *Twelfth Night*; the process of conceptualising dominated.

In Lesson 7, the teacher outlined the context of the play, the characters and setting, and then discussed the various themes while making notes on the white board. She generally read for about one minute and then paused to unpack the reading. She would often encourage learners to figure things out for themselves, as is evidenced at the end of the extract in Table 5.87 where she said, “*I know you can work this out. Use your brains...*,” and later she told learners, “*Use your insight*”.

Table 5.87: Lesson 7: Twelfth Night

Lesson 7: *Twelfth Night*

Teacher 1; learners 2

1. The teacher outlines the context of the play, speaks about the characters, the setting and themes to take note of.
 - She mentions that one of the themes is the tyranny of love, then asks learners to state what comes to mind when they think of the words ‘tyrant’ and ‘tyrannical’ and what ‘tyranny’ means.
2. They mention ‘struggle’, ‘difficult’, ‘painful’ and ‘heart wrenching’.
1. The teacher then speaks about the conflict between reason and passion or emotion, logic vs intelligence etc.
 - The teacher writes keywords on the white board and as they discuss the themes, she adds to the whiteboard.
 - She then asks, “Where do we see behaviour like this in the play?”
2. One learner refers to the shift in one character who is first ruled by reason and later by emotion.

They continue to discuss more common Shakespearean themes for another 15 minutes.

The teacher and learners unpack the meanings of other words.

1. She reads again as learners follow in their books; they highlight and take notes.
 - In one instance, the teacher reads then says, “I know you can work this out. Tell me line by line. Use your brains and notes in the margins”.
 - In another instance she says, “Listen to the lines carefully and use your insight”.

The exploration of the various themes in the play as well as the shift in character represents conceptualising with theory.

The process of applying functionally was observed in Lesson 9 during the discussion on sonnets (referred to in section 5.6.3.3) when learners were asked to “*work out the structure*” by process of deduction and by using their prior knowledge of poetry analysis.

In the extract in Table 5.88, the teacher revised poetic devices and poetry analysis using an acronym (I-C-E-D) that learners previously created prior to observations. This can be seen as a formula for analysing a poem, which is an example of conceptualising with theory.

Table 5.88: Lesson 10: Poetry analysis

Lesson 10: Poetry analysis <i>Teacher 1; learners 2</i> <i>The teacher and learners discuss the poetic devices and figures of speech with the teacher asking questions and learners responding and the teacher providing clarification.</i> 1. The teacher then refers to an acronym that the learners had come up with to help in the analysis of a poem, which the teacher said was so good, she shared with other grades. - She asked them to recall it, which they did and what the different letters stand for. ICE while others added a ‘D’ <i>Together they discuss the meaning of each letter: I – identify; C – compare; E – effectiveness (some say explain and the teacher says that to discuss effectiveness, you need to explain).</i> 1. The teacher explains in detail giving examples. - She then asks what the ‘D’ stands for. 2. A number of learners respond, “Diction”. 1. The teacher explains its importance and gives examples. - She adds that if they follow the formula, they will get marks along the way. - She then goes through each question about the poem and unpacks how to go about answering them. 2. The learners write and make notes.

The final lesson, an extract of which is in Table 5.89, is another example of the knowledge processes conceptualising by naming and analysing functionally and critically. Conceptualising by naming was evident in the explanation of meaning of the words ‘heresy’ and ‘soliloquy’, and the process of analysing, a feature of critical framing, was evident in the analysis of the purpose of ‘exaggeration’ in the text and the discussion of poetic devices. Learners’ reflection on what they had learnt about a particular character based on the reading is an example of critical analysis.

Table 5.89: Lesson 11: Twelfth Night

Lesson 11: Twelfth Night <i>Teacher 1; learners 2</i> 1. The teacher begins to read.

2. Learners follow in their books.
 1. The teacher pauses after less than a minute to explain the word 'heresy'.
 - She reads again.
 - She pauses shortly after for a brief discussion.
 - She reads again and asks a question.
 2. Learners respond.
 1. The teacher gives further explanation, then reads again before pausing to ask a question.
 2. A learner responds.
 1. The teacher affirms the answer then continues to read.
 - She pauses to discuss a few poetic devices.
 - She indicates that a shift from prose to verse indicates that the conversation has become more serious.
 - She reads again, then pauses to point out exaggeration, then asks learners what they notice.
 2. Learners point out that the use of exaggeration indicates insincerity, something that was discussed previously.
 1. The teacher then asks each learner to reflect and say what they have learnt about the character based on the reading.
 2. Learners give their opinions.
 1. The teacher affirms their responses, delves into vocab, then asks questions.
 - She calls on various learners to give their views.
 2. Learners offer their opinion
 1. The teacher continues to read, then pauses to explain
 - She then asks, "What do you notice about the conversation?"
 - She says, "There's a soliloquy which I want you to take note of".
 - She directs learners to the task in the booklet that they need to do when she's away in the coming week.
 - She says that learners can google answers if they need clarification.
 - The teacher asks, "What is a soliloquy?"
 2. Three learners respond.
 1. The teacher adds to the explanation, then says why it's important.

The poetry writing that was observed during the first lesson was an example of the creative application of their knowledge on poetry. Learners were also given the opportunity to choose their style of poetry and create a poem that engages the senses. The task stated the following:

- Choose from the following emotions: happiness, anger, love, loneliness, frustration, fear, delight, horror, excitement, grief, sadness, triumph, jealousy.
- Compose your own poem using your chosen emotion as a subject.
- Engage all five of your reader's senses in your poem by describing how your chosen emotion looks, feels, tastes, sounds and smells.
- Let your imagination run wild and take your reader on a sensory journey with you.

Lauren's English lessons provided opportunities for a mix of knowledge processes, particularly analysing functionally and conceptualising with theory. There was opportunities for experiencing by relating the issues of women in *Twelfth Night* to issues faced by contemporary women, thereby allowing learners to incorporate their own lived experiences and demonstrating that their epistemological diversity was valued. There were many opportunities of applying, in particular, applying appropriately.

In conclusion, while William's History lessons had a greater mix of knowledge processes with equal opportunities for conceptualising, experiencing and analysing and less opportunities for applying, Lauren's English lessons demonstrated a blend of conceptualising with theory and analysing functionally as the class made sense of the Shakespearian play and poetry structures. There were opportunities in Lauren's class to harness learners lived experiences and for their interests to be valued, but this was more widespread in William's classroom. There was therefore a dominance of teacher-student and student-content interactions, followed by teacher-student-content and student-student interactions in Lauren's classrooms, and in William's, there was a dominance of teacher-student-content and teacher-student interactions, followed by student-content and student-student interactions.

5.6.4 Teachers' Perceptions of the 21st Century Classroom

In my interview with the Head of the College, she expressed the view that the contemporary classroom, which she referred to as the learning environment", is *"a more open and flexible learning space"*. She stated that *"we shouldn't be having classrooms with the teachers in the front and the children are all in neat little rows. So that is a challenge, because there's still a lot of classrooms here that have just the normal classroom setup and the one-way teacher talk"*. Instead, she suggested that one needs to *"try and encourage teachers to experiment, to actually let go. So, the children are the ones that are supposed to be asking the questions and looking for the answers"*.

Consequently, Ilana argued for a pedagogical shift and a change in mindset regarding *"how they [teachers] assess, how they teach, that's a lot more integrated"*. This view was shared by William, the History teacher and Deputy Head of the College. He stated the following:

It's not about the content. I'm going to teach you how to think. And it's moving a mindset but it's very hard to break. A mindset that is grounded in assessment and measures of success that is grounded in, to a large extent, still a recall and knowledge game and trying to move to an analysis and critical thinking kind of game.

He strongly felt that *"there are some subjects that are still very grounded in a curriculum that hasn't looked very different and an assessment methodology that hasn't looked very different from what has been for a long time"*. There is also a fixation on marks, which he found lamentable. Therefore, he suggested that in the 21st century classroom, assessment will change and this will determine how one delivers and engages with content. He argued, *"We would not have a high-stakes exam, an exam which just verifies that you've done this but the other work would be far more important, your creative work, your research skills, your problem-solving skills."* Yvette, Head of Innovation, Training and ICT Services, equally argued for a pedagogical shift and the need to *"move away from silos"* to a more integrated approach.

In terms of key skills for the 21st century, Ilana argued for the four Cs: collaboration, communication, creativity and critical thinking. She posited that *"with the collaboration skills come the communication skills, the sharing, the letting go of control, doing things together"*. However, she linked this to *"the old-fashioned sort of group work kind of style,"* which she stated is a life skill along with critical thinking. The ability to discern what is *"valid, fair, authentic, or whether it's fake news"* is important.

Lauren, the English teacher, argued that in the 21st century, learners need to be taught how to think, analyse and question. She also highlighted the importance of critical literacy, especially as it relates to the teaching of English language and literature. In our interview, she stated, *"Because the world is changing at such a rate and we have to be able to equip our learners with the ability to be able to think and analyse and interrogate and question"*. Unlike the principal, she did not agree that collaboration is very important, especially since *"the world was becoming less insular and global"*. However, she cautioned that although opportunities were provided for learners to work in groups, there could be challenges that require teachers to find creative ways to make group work successful and assess learners' group tasks. She said the following in the interview:

So, when you do those sorts of tasks then we have to be particularly aware of perhaps allocating the group so that that we ensure that we've got different people with different abilities, different skills in the group. But then also, holding them accountable so sometimes you might get them to assess one another's contribution and make sure that they know that it is anonymous and that they can be completely honest ... But it's always quite a tricky one.

Yvette argued for a change in the way technology is adopted in the classroom and recognised that *"it takes time and energy to change"*. She found that *"sometimes we pay lip service and we tick a box and we do these things, but we're not fully invested 'cause fully invested is hard work 'cause you've got to retrain a whole bunch of parents too"*. She stated that learners in the 21st century must have the choice of digital tools for a specific task. Therefore, teachers need to change their mindset and not ask learners to *"produce a digital presentation"* and not specifying the number of slides in a presentation but instead *"let the children find the best digital tool"*. The approach to technology use should therefore mirror what happens in the world of work so *"when you present a presentation at a board, when you're a corporate person, they don't go, did you use PowerPoint or did you use Prezi or whatever; they go, does the presentation enhance what you're trying to sell and do?"*

Yvette also emphasised that teachers need to use data and statistics to improve learner performance in the contemporary classroom. She gave the example of the International Benchmark Tests and stated the following:

So, this school writes the IBTs [International Benchmark Tests], so this is my personal opinion, please note I might be wrong. So they write the IBTs in Grade 3, Grade 6 and Grade 9 in English and Maths ... and they get all the stats in the world per child, per school, benchmarked to Australia, benchmarked to everybody ... Nobody went and looked and said, 'the whole cohort didn't do punctuation, let's investigate what IBTs asks about punctuation'. Maybe it's because we write IBTs in March, for example, and we do question marks and exclamation marks in September. So maybe that's why they do badly ... So, it's not about having to change, it's about knowledge ... so we've got the stats but we don't

go and make a remedy. Then we get to Grade 6, and she still sucks at punctuation and so are we going to get to Grade 9 and she still sucks at punctuation?

William concluded by saying that 21st century classroom must include digital technologies as well as integrate different skills to develop the whole person. He averred that for him the 21st century classroom includes digital technologies, “*but ... the technology is the provider of the information and using that, feeding that information better into the classroom, more current, more relevant information into the classroom via the technology*”. This view suggests better use of data generated from technology to inform one’s practice. The new classroom should therefore include “*more discussion, more analysis, more critical thinking ... more debate*” and less focus on the examination so that “*you would never get asked the question ‘is this in the exam?’... We are not just teaching towards an exam. We are educating and we’re creating a whole person ... more focus on what do you think, not what you know but what do you think about what you know*”.

Ilana added that “*the pedagogy has to change*”. She stated the following:

The learning environment becomes the vehicle by which you’re actually doing all of this. We have to design learning activities that challenge them [learners], that it’s not just the regurgitation of knowledge that they can just go off on the internet, get it from there and just put it in. It’s about, what have they learnt from that in order to do something more, to create something out of it in collaboration with others”.

It is therefore clear that there is consensus among the teachers that pedagogical change in the contemporary classroom is necessary. This change should extend to the way digital technologies are used, including the use of data and statistics to guide one’s practice.

In conclusion, there was a diversity of views around the 21st century classroom expressed, and some looked at their specific school while others addressed what this means for the entire system. There was convergence, especially among private school educators, about the need for flexibility and an integrated approach to curriculum. In all schools there was agreement that the ability to think critically and for critical literacy is vital. Furthermore, most educators, especially class teachers, were not convinced that collaboration is an important skill. There is a general

sense that there is a lack of clarity about what collaboration is and how it differs from group work and how it should be assessed.

5.7 CHAPTER SUMMARY: MAPPING TEACHERS' APPROPRIATION OF DIGITAL TECHNOLOGIES AND THEIR PEDAGOGICAL STRATEGIES

This chapter presented a summary of the 10 teachers' use of digital technologies and their pedagogical practices. The general finding is that in both private schools and government schools teachers' use of digital technologies is mainly for representative purposes with a focus on learning *from* rather than learning *with* technologies. This was in a sense surprising since two of the private schools have access to digital teaching platforms that are part of their colleges' technology offerings. They also have access to continuous teacher learning activities in the use of technologies. Data from the interviews, observation of learners' creative work at Baker College's PLC as well as information gathered from Queenstown College's newsletter and social media platform indicated that learners are using digital technologies in transformative ways in the Mathematics and Science classrooms (Baker and Queenstown Colleges) and outside the classroom, thereby harnessing the action capabilities of the various technologies at their disposal.

The affordances that were used most often in class by the teachers were multimodality, nonlinearity and accessibility. However, although some teachers, mainly those in private schools, used digital technologies in a representative sense, the purpose for which they used them was largely to generate discussion and debate, and in many government school classrooms, their debate around the digital content was minimal, with one exception.

Regarding teachers' pedagogical practices, there was evidence of a mix of interaction modes and knowledge processes, which was greater in private schools.

Figure 5.1 maps teachers' appropriation of digital technologies with their pedagogical strategies to determine how transformative their technological and pedagogical strategies were. Appropriation of digital technologies is placed on the x-axis and teachers' pedagogical strategies placed on the y-axis. The x-axis represents Hokanson and Hooper's (2000) continuum of media

(technology) use from representative use, indicating learning *from* technology to generative use of technologies, indicating learning *with* technologies. Added to this is teachers' harnessing of digital affordances. Pedagogical strategies on the y-axis combine Anderson's (2002, 2004) modes of interaction and the learning by design pedagogy (Cope & Kalantzis, 2009, 2015).

The figure is divided into four quadrants described in the following way:

- Quadrant A: Teachers whose pedagogical strategies are transformative or have "transformative pedagogical dispositions" (Tarling & Ng'ambi, 2016) but who use digital technologies only for representative purposes with less than three digital affordances.
- Quadrant B: Teachers with transformative pedagogical dispositions and who use technologies for representative and generative purposes with less than three digital affordances. REP+gen demonstrates majority representative technology use with minimal generative use. REP+GEN demonstrates equal opportunities for representative and generative uses of technology. GEN+rep suggests more opportunities to learn with technology in transformative ways and fewer representative use as this study posits that it is not possible to eliminate the representative use of technology from the classroom.
- Quadrant C: Represents teachers who have more traditional pedagogical dispositions and who need to integrate technologies more into their practices.
- Quadrant D: Represents teachers who use technologies for representative and generative purposes but whose pedagogical strategy is not transformed. This is seen as an anomaly.

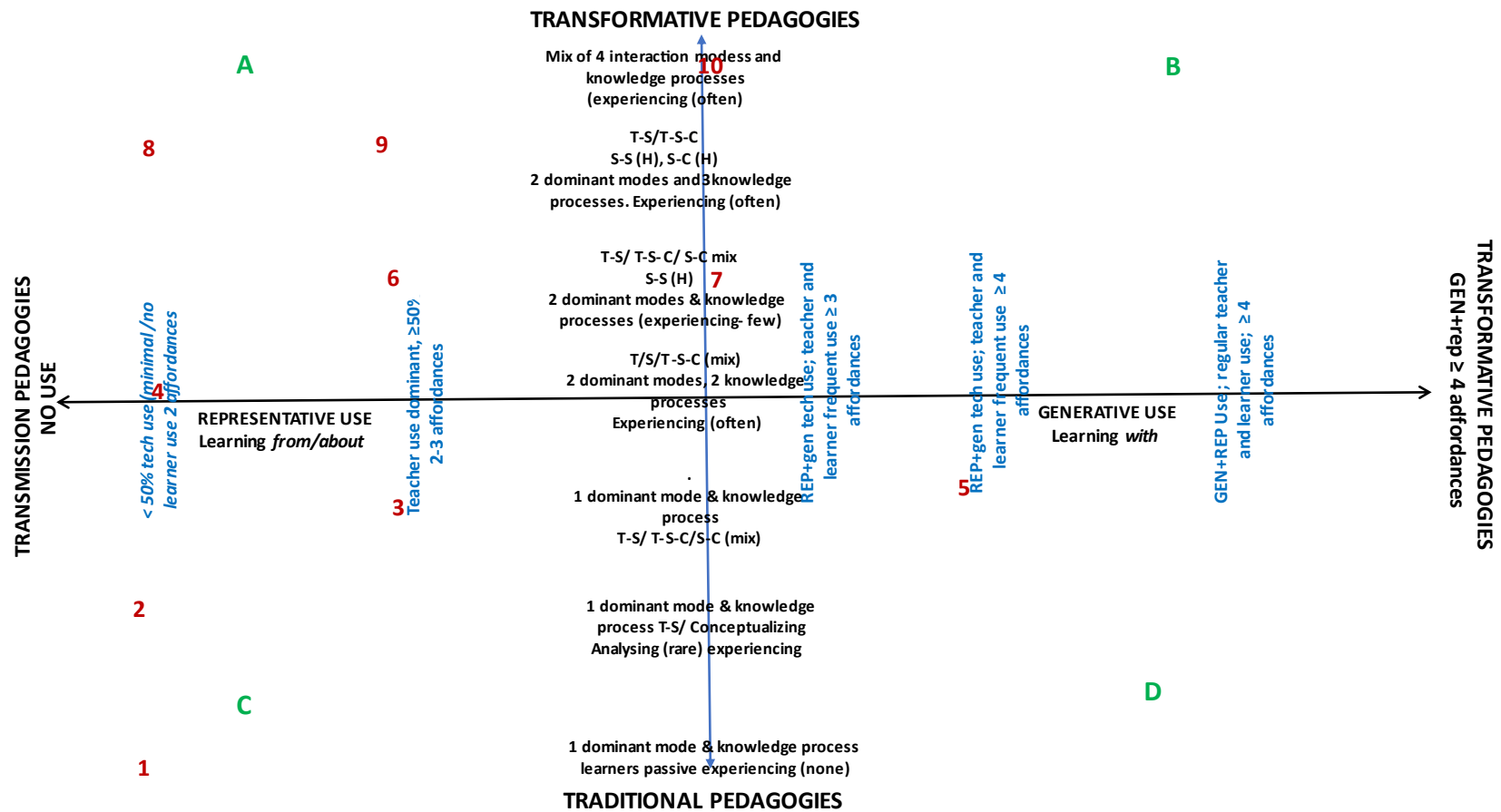


Figure 5.1: Mapping teachers' pedagogical practices with their technology use

The teachers whose pedagogies can be described as transformative demonstrated a blend of knowledge processes as well as modes of interaction. In particular, there was evidence of medium-high teacher-student-content interaction as well as the knowledge process of analysing and applying with teachers harnessing learners' epistemological diversity represented by the knowledge process of experiencing.

William (9), Alice (8) and Lauren (6) were placed in Quadrant A, and Palesa (4), the English teacher from Hampton High School, was placed on the border between traditional pedagogies and transformative pedagogies. In Palesa's lessons there was evidence of a mixing two modes of interaction, teacher-student and teacher-student-content, usually with both at medium level with the two knowledge processes conceptualising and analysing, which in some instances included experiencing as she related issues in the text to learners' lived experiences. In another activity, there was a blend of the knowledge processes of conceptualising, applying, and experiencing. However, student-student interaction was minimal, and except for two student-content activities requiring learners to apply knowledge learnt, student-content interaction involved learners passively watching a movie for film study and copying chapter summaries. Hence, all engagements with digital technologies were passive.

Lauren's pedagogical strategy generally demonstrated a blend of two modes of interaction and two knowledge processes, which is teacher-student and teacher-student-content interaction with conceptualising and analysing. There was also evidence of three modes of interaction, teacher-student, teacher-student-content, and student-content, and three knowledge processes, conceptualising, analysing and applying, although the latter was less frequent. The knowledge process of experiencing was infrequent in her classroom. However, while she displayed transformative pedagogical dispositions, her use of digital technologies could be described as representative despite her having attended numerous teacher learning activities and having ubiquitous access to them. Similarly, William's pedagogical strategy was largely transformative with evidence of him weaving between the four knowledge processes. However, opportunities for learner collaboration through student-student interaction and student-content were limited. Like Lauren, he used digital technologies in a representative sense and did not exploit the affordances of the different forms of technologies available to him and the learners.

Like William and Lauren, Alice displayed transformative pedagogical strategies as she used multiple modes of interaction; although student-student and student-content were infrequent. She also combined the various knowledge processes to make meaning in the classroom. The dominant modes of interaction were teacher-student and teacher-student-content interactions and the combination of knowledge processes were conceptualising, analysing and experiencing and conceptualising, analysing and applying. The knowledge processes of experiencing and applying were also used frequently. However, Alice rarely used digital technologies in her class, except to show a downloaded documentary and to project images onto the smartboard. Learner technology use was also forbidden. Hence, her use of digital technologies was representative.

Liselle (10) and Cathy (7) from Queenstown College were on the borderline of transformative technology use although they had access to continuous professional development activities in their use and used the Apple teaching platform, which afforded a wide range of interactive activities. Liselle's practice represented a rich blend of pedagogical strategies with her seamlessly weaving between knowledge process and modes of interaction while recruiting learners' prior knowledge and lived experiences to provide meaningful learning experiences. This confirmed her view that higher-order thinking skills are important; thus, her practice matched her pedagogical beliefs. Cathy's History lessons also showed evidence of a wide use of modes of interaction as well as knowledge processes, although there were less examples of learners' diversity being privileged. Her lessons were also more tightly controlled.

Natasha (1), Mariette (2) and Stacey (3) fell within Quadrant C. Since learners in Southridge High School were not allowed to access the school's Wi-Fi and had general issues with technology access, it was expected that Natasha and Mariette would use digital technologies in a representative sense. However, Natasha permitted no discussion around digital content. In fact, in her History class, learners' voices were not privileged. Consequently, there was no evidence of the knowledge process of experiencing with one mode and one knowledge process being dominant. There was also one dominant mode of interaction and one dominant knowledge process in Mariette's classroom since most of the time was spent listening to or reading the literature text. In Stacey's class, there was evidence of a mix of knowledge processes and modes of interaction that combined teacher-student and teacher-student-content interaction with

conceptualising and analysing or applying. However, teacher-student interaction and the knowledge process of conceptualising dominated. While there were attempts to recruit learners' prior knowledge in the meaning-making process, this did not occur frequently.

Marie (5) in Quadrant D was an anomaly as she used digital technologies extensively and in different ways in the classroom and made use of a wide range of affordances. She also displayed transformative pedagogical dispositions by blending teacher-student, student-content and teacher-student-content interactions with the knowledge process of conceptualising, analysing and experiencing. However, further evidence of this was very limited as a number of activities did not seem to relate to the poetry topic and seemed to lack pedagogical value. In contrast to the other classrooms, in Marie's classroom, student-content interaction and the knowledge process of experiencing were dominant as learners' epistemological diversity was highly privileged. This was linked to her belief that it was important for learners to have access to a diversity of authentic texts that are relevant to their lives. However, poor classroom management meant that learners continuously used digital technologies for non-pedagogical purposes, and consequently, only very few of them completed their tasks. This confirmed Marie's comment that teacher engagement does not exist as soon as technology is used.

The next chapter presents the quantitative findings from this mixed methods study.

CHAPTER 6: SURVEY FINDINGS

6.1 INTRODUCTION

This chapter presents the findings from the teacher survey that was conducted in the five participating schools. The survey's purpose was to identify ways in which teachers in the participating schools have appropriated digital technologies within their classrooms and to provide insight into teachers' pedagogical choices. Accordingly, the survey questions were designed to elicit information about teachers' demographic profile, training and experience, access to and use of digital technologies, and perceptions of the types of classroom interactions, 21st century skills and the 21st century classroom.

The analytical strategy adopted for this part of the study is descriptive analysis. Descriptive statistics were compared across schools to identify areas of convergence and divergence. A range of charts was used to depict the data that were grouped around teacher experience and professional development in digital technologies; access and use of digital technologies; teachers' perceptions of classroom interactions and 21st century skills. In terms of frequency of use, high level frequency was determined by combining response scores for *all the time* and *often*, and low-level frequency was determined by combining response scores for *sometimes* and *rarely*.

6.2 RESPONSE RATE

Three hundred and one teachers were surveyed, and 176 (n = 176) participated in the survey, giving a response rate of 58%. The response rate for each school is shown in Table 6.1.

Table 6.1: Response rate

School	Number of teachers surveyed	Number of responses received	Response rate
Queenstown College	50	39	78%
Baker College	36	31	86%
Southridge High School	83	49	59%
Hampton High School	65	36	55%

School	Number of teachers surveyed	Number of responses received	Response rate
Duke's College	67	21	31%
Total	301	176	58%

The teachers' demographic profile is depicted in Figure 6.1. Respondents were on average female (74%). The four schools where there were a higher proportion of female teachers were schools for girls and co-ed schools; Duke's College with the higher proportion of male teachers is a school for boys.

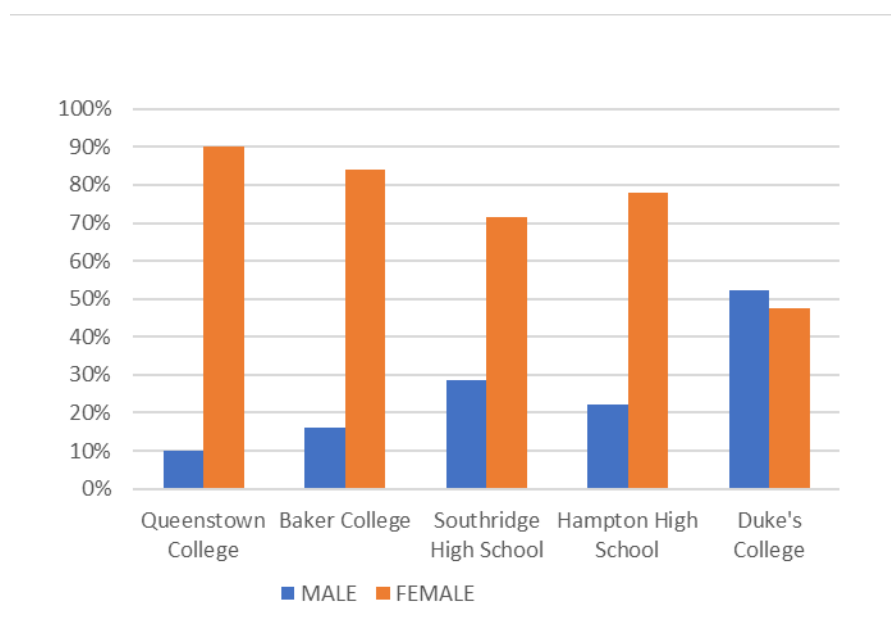


Figure 6.1: Demographic profile of teachers who responded to the teacher survey

6.3 TEACHER EXPERIENCE AND TRAINING IN DIGITAL TECHNOLOGIES

The findings from the teacher survey depicted in Table 6.2 shows that except for teachers at Hampton High School (42%), over 60% of teachers has been in the profession for 11 years and more and has thus undertaken pre-service training that did not include the use of digital technologies. These findings were expected given that digital technologies were recently introduced into teaching and learning in South African schools. This also strengthens Koehler et al.'s (2013) argument in favour of ongoing professional development because many teachers

received their initial teacher training when digital technologies were at a different stage of development.

Similarly, Hampton High School had the highest percentage of teachers (39%) whose pre-service training had included the use of digital technologies. Nevertheless, Chigona (2015) found that newly qualified teachers are ill-prepared to teach with ICTs due to the poor quality of instruction and lack of technological pedagogical content knowledge at the pre-service level. This provides another reason for sustained teacher learning activities in digital technologies and possibly explain why the DoE's e-education goal that schools would be ICT ready by 2013 was unrealistic and aspirational.

However, the survey data in Table 6.2 suggests that the training problem was being addressed during in-service training, except for Southridge High School. Consequently, 92% of all teachers indicated that they had access to ongoing training in the use of digital technologies at their respective schools; the lowest percentage (63%) was at Southridge High School. Yet, this was not always borne out in qualitative data. For example, the Head of Information Technology at Southridge High indicated that the school offered no training in the use of digital technologies to its teachers.

Table 6.2: Teacher experience and training in digital technologies

School	N	Teaching experience (years)					Pre-service training in digital technologies	Ongoing training in digital technologies
		< 1 year	1–3 years	4–10 years	11–20 years	> 20 years		
Queenstown College	39	5%	10%	21%	28%	36%	33%	100%
Baker College	31		3%	23%	29%	45%	16%	100%
Southridge High School	49		12%	24.5%	39%	24.5%	17%	63%
Hampton High School	36	6%	19%	33%	11%	31%	39%	94%
Duke's College	21			19%	29%	52%	19%	100%

6.4 APPROPRIATION OF DIGITAL TECHNOLOGIES

6.4.1 Access to Digital Technologies

Figure 6.2 shows that 97% of teachers in the five participating schools had access to Wi-Fi; Duke's College accounted for the lowest percentage (90%). This confirms observation and interview data that revealed that Wi-Fi access at the College was at times unreliable. In Baker, Duke's and Queenstown Colleges as well as Hampton High School teachers were issued with laptops for pedagogical use. Survey data thus confirm this with an average of 90% of respondents indicating that they had access to laptops. The three independent schools, Baker, Duke's and Queenstown Colleges, all indicated 100% access to laptops. Only 53% of teachers from Southridge High School indicated that they had access to laptops, but 100% of survey respondents from that school had access to school issued tablets for pedagogical use.

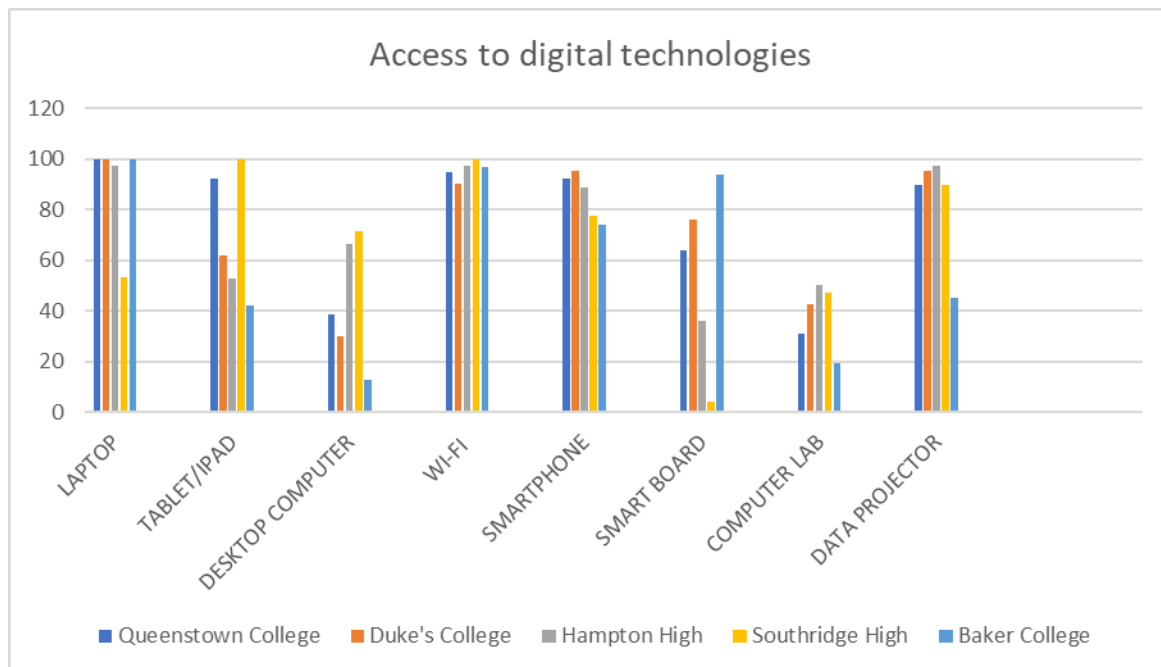


Figure 6.2: Access to digital technologies

Figure 6.2 also shows that 92% of survey respondents from Queenstown College, which mainly uses the Apple platform, had access to tablets as their teachers were issued with both iPads and MacBooks. The other form of digital technologies to which most survey respondents (83%) had access was the data projector. The highest percentage (97%) of teachers with access to a data

projectors was from Hampton High School. On the other hand, 45% of teachers from Baker College indicated that they had access to a data projector. This was to be expected as the Head of Innovation, Design and Staff Training indicated in our interview that *“every classroom has an interactive panel, which is like a touch interactive TV, 86 inch”*.

Survey data from Baker College indicated the largest percentage of access (94%) to smartboards. Duke’s College (76%) had the second highest access to smartboards, followed by Queenstown College (64%). Access to smartboards was greater in private independent schools than at public schools, and the latter had higher percentage access to desktop computers and computer laboratories. These represent an initial approach to technology integration when schools were first fitted with computer labs and desktop computers. Figure 6.2 shows that 71% of teachers at Southridge High School had access to a computer lab, and 47% of them had access to desktop computers. At Hampton High School, 67% of teachers indicated that they had access to a computer lab and 50% had access to desktop computers. Finally, the mean number of teachers who responded that they had access to smartphones in school was 86%, represented by 95% for Duke’s College, 92% for Queenstown College and 74% for Baker College.

Padayachee (2017) stated that access to technology “is an essential element towards successful ICT integration” and the government’s White Paper on e-Education (2004) lists access to ICT resources as an important feature of e-schools. These findings indicate that Wi-Fi, laptops, data projectors and smartphones are the most accessible forms of digital technologies for a large majority of teachers in the five participating schools.

6.4.2 Frequency of Technology Use

Figure 6.3 captures the high frequency use of the main technological tools to which teachers in the five schools had access. High frequency use combines responses for *all the time* and *often*. The chart reveals that Wi-Fi use was dominant in all the schools, surpassing 90%. Except for Baker College (16%), the data projector was used with high frequency by the four other schools, representing 100% for Duke’s College and 72% for Hampton High School, which recorded the lowest percentage of use among the four schools. Since Baker College had the lowest access to data projectors and the highest access to smartboards, it stands to reason that they would have

the highest usage of smartboards at 87%. Duke's College was the only other school to record over 50% use in smartboards. Smartphones were used with high frequency by all participating schools, exceeding 60% at Queenstown College and Hampton High School and 80% at Duke's College. Laptops were also used with great frequency among the four schools whose teachers were issued with such devices. Its use was 100% for teacher respondents at Duke's and Baker Colleges, 97% at Queenstown College and 92% for Hampton High School. On the other hand, teachers at Southridge High School used tablets with great frequency (94%). Queenstown College, the only other school to have school issued tablets, recorded high frequency (62%) use of the devices.

The survey findings relating to the high frequency use of laptops correlated with the qualitative findings from classroom observations. These revealed that laptops were the most frequently used digital devices by teachers, except for Southridge High School. Additionally, the data projector was the most frequently used except for Baker College. Although the survey data reveal that smartphones were used with great frequency, it was only observed on one occasion at Duke's College.

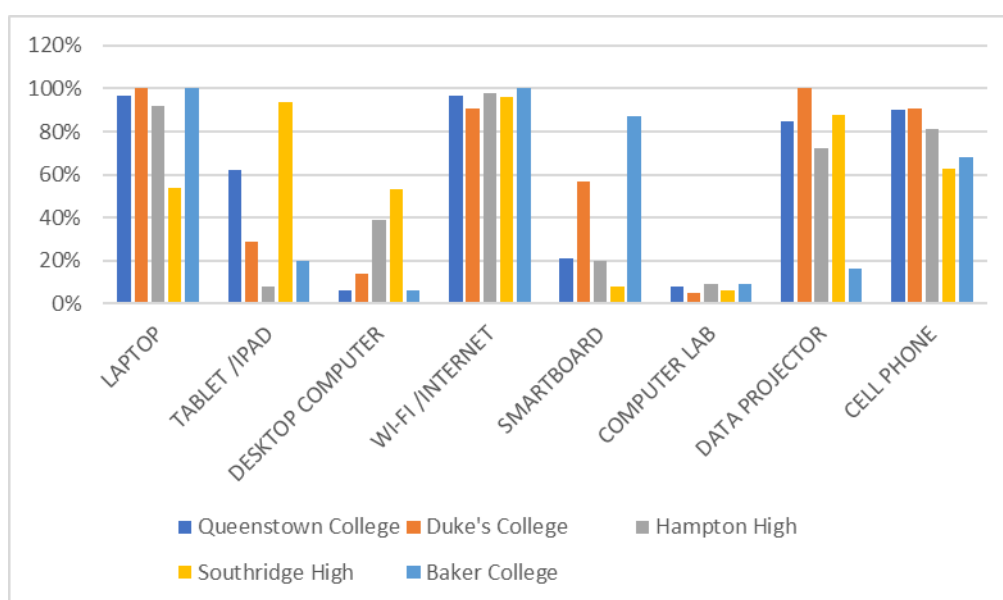


Figure 6.3: Frequency of technology use

It is evident from Figure 6.3 that with the exception of the smartboard and data projector, mobile devices in the form of laptops and smartphones were used with great frequency by teachers. The computer lab and desktop computers were used with less frequency, except for Southridge High

School where 53% of teachers indicated using desktop computers with high frequency. These findings are therefore consistent with those of Padayachee (2017) that the most frequently used tools for pedagogical use are mobile learning tools.

6.4.3 Purpose of Technology Use

Table 6.3 depicts teachers' use of technologies. It combines scores for *all the time* and *often* to reflect high frequency usage. The data reflects that digital technologies were used predominantly for lesson preparation, and that it was most frequently used (90%) to search the internet for information and resources to prepare lessons. This response had the lowest standard deviation and each school's score were very close to the mean, with the exception of Southridge High School, whose score was furthest from the mean (45%). Southridge High School's percentage was 60%, and teachers in the other four schools indicated that they also use frequently applications to prepare lessons.

Again, except for Southridge High School, teachers indicated that they use digital technologies quite frequently to create their own teaching resources. This is done most frequently by teachers at Baker College. The activities that were done with less frequency are the use of digital technologies for teaching or interacting with learners. The data in Table 6.3 shows that teachers in the three private independent schools used technology most frequently to post homework and assignments for learners, but that this was done quite rarely in the public schools. This is to be expected as students from these schools had less access to digital technologies outside of school, and as the History teacher at Hampton High School noted in our interview, "*Not all the kids have access to internet connections at home or to even stable electricity*". Consequently, this activity had the largest standard deviation as the data were widely spread.

Table 6.3: Purpose of technology use

	Queenstown College	Duke's College	Hampton High School	Southridge High School	Baker College	Mean	Standard deviation
Search the internet for information and resources to prepare lessons	97%	95%	83%	86%	90%	90%	0.06
Use apps to prepare lessons	62%	67%	56%	45%	71%	60%	0,10
Use apps to present lessons	44%	29%	31%	38%	69%	42%	0,16
Create your own learning resources	69%	67%	64%	49%	94%	69%	0,16
Post homework and assignments	62%	76%	19%	6%	74%	47%	0,33
Provide feedback and access student learning	49%	33%	31%	14%	36%	33%	0,13
Provide opportunities for blended learning	51%	20%	28%	20%	68%	37%	0,21
Download/upload/browse material from learning platform	77%	62%	50%	20%	87%	59%	0,26

While Duke's College recorded the highest percentage (76%) of teachers who post homework and assignments for learners, only 33% indicated that they provide feedback on and access learners' work using digital technology. Baker College recorded the second highest percentage of teachers who post homework and access learners' work, but only 36% indicated that they use technology to provide feedback. Similarly, in Queenstown College, 62% of teachers indicated that they post homework online for learners and 49% provide feedback on learners' work, which was the highest percentage in this category. It is evident that despite the possibilities of providing feedback on learners' work afforded by the various learning platforms available, especially to teachers at Baker and Queenstown Colleges, these were not being maximised. These learning platforms afford the opportunities for blended learning, but only 51% of teachers from Queenstown College indicated that they exploit this potential; this figure was higher for Baker College at 68%. Given the lack of out-of-school access to continuous wireless connectivity by learners in government schools, it was to be expected that less than 30% of teachers in these schools indicated that blended learning occurred. Data from Queenstown and Baker Colleges, which have dedicated learning platforms, indicated that over 70% of teachers use these platforms to download or upload materials. Baker College had the highest percentage use at 87%. The use of a learning platform was 50% for teachers at Hampton High School and only 20% for teachers at Southridge High School.

6.5 INTERACTIONS IN THE CLASSROOM

6.5.1 Frequency of Classroom Interactions

Figure 6.4 displays the frequency of classroom interactions as evaluated by the survey respondents. The patterns of interactions are based on Anderson's (2003) interaction equivalency theorem. The data reveals that teacher-student interaction is the most frequent mode of interaction, with the lowest score being 92% for Hampton High School. Teacher-student-content is also very high in four schools, except in Hampton High School, whose score was 67%. Southridge High and Queenstown College was the highest at 92%. Student-student and student-content interaction recorded the lowest mean score of 81%. Student-student interaction was the highest in Queenstown College (97%), second highest Southridge High School and Baker College

at 84%, and the lowest at Hampton High School (58%). Student-content interaction occurred at relatively high frequency in all the schools and was highest in the three private schools. The data in Figure 6.4 therefore indicates that interaction with the teacher is the most highly valued as it occurs most frequently.

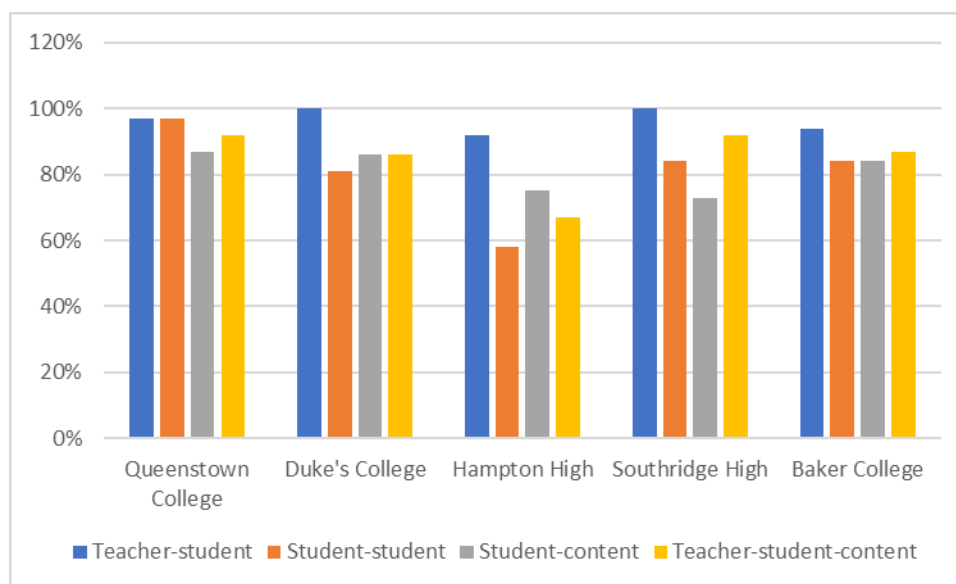


Figure 6.4: Frequency of classroom interactions

While the results for Hampton High School reflect the classroom observations, there was great disparity between what was observed during classroom observations at Southridge High School and the survey data in Figure 6.4, which reveal a high frequency of teacher-student-content interaction. However, this type of interaction was rarely observed in the English class and absent from the History class. Additionally, the data reflected high frequency of student-student interaction at Southridge High School, and this was not observed in either classroom. Queenstown College reflected the highest frequency of student-student interaction, and this mode of interaction was high at Baker and Duke's Colleges as well. Nevertheless, a high level of student-student interaction was not observed at Baker College as there were limited opportunities for learners to work together in both the English and History classes.

6.5.2 Teachers' Perceptions of 21st Century Skills

Teachers were asked to rank in order of importance their views on a selected list of 21st century skills. Figure 6.5 shows that the most important skills were critical thinking, communication and problem-solving. There seemed to be a general consensus among all the survey respondents that innovation and information literacy are not very important skills for learners to be taught. Additionally, with the exception of Queenstown College (87%), responses indicated that collaboration is the least important skill with a mean of 74%. However, the picture for individual schools in this regard was quite varied. The response from Queenstown College regarding collaboration corroborates the data from Figure 6.4 in which 97% of teachers indicated that student-student interaction occurs with high frequency. Conversely, the responses from Baker College reveal a high frequency (84%) of student-student interaction while only 68% of teachers responded that they viewed collaboration as an important 21st century skill. Likewise, at Duke's College, 81% of teachers indicated a high frequency of student-student interactions but only 71% of them indicated that collaboration is important skill.

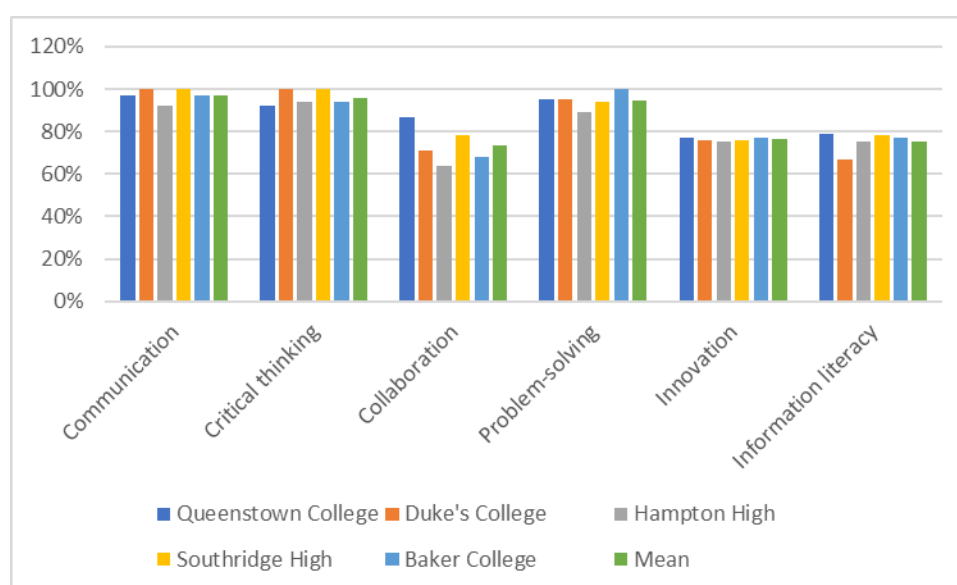


Figure 6.5: Perceptions of 21st century skills

6.5.3 Teachers' Perceptions of the 21st Century Classroom

Teachers were asked to give their views on statements about the classroom and the use of digital technologies. Framed around the issue of the need for the classroom to be an authentic representation of the world in which we live, they were asked to indicate if “The classroom should reflect the real world”. Table 5.4 shows that except for Duke’s College (71%), most teachers agreed with the statement. The second statement, “Classroom resources and activities must reflect learner diversity” spoke to harnessing learners’ epistemological diversity. Most teachers indicated that they agreed with the statement. A very high percentage (92%) of teachers from Southridge High School indicated that digital technologies are changing the way they teach. This was the highest percentage for this statement and was surprising since Southridge High School was the only school that restricted learner access to digital technologies. Additionally, data from Table 6.3, indicating the purpose for which digital technologies are used, show that teachers at Southridge High School predominantly use technology for lesson preparation. Responses from the other schools to the third statement were also over 80%, although apart from Baker and Queenstown Colleges, digital technologies seemed to influence teachers’ lesson planning instead of the way they taught. Most teachers (93%) perceived that digital technologies are changing the way students learn.

Table 6.4: Teachers’ perceptions of the 21st century classroom

	The classroom should reflect the real world	Classroom resources and activities must reflect learner diversity	Digital technologies are changing the way I teach	Digital technologies are changing the way students learn
Queenstown College	97	97	90	100
Duke’s College	71	100	81	90
Hampton High School	100	97	81	89
Southridge High School	100	96	92	92
Baker College	100	94	84	94
Mean	94	97	86	93

6.6 SUMMARY OF QUANTITATIVE FINDINGS

In summary, the findings from the survey indicate that teachers have access to a number of technologies and pervasive Wi-Fi in schools, which are influencing their practice. In terms of teachers' appropriation of digital technologies, these are mainly used in lesson planning and preparation and not to present lessons or teach. This is despite most teachers indicating that these technologies are changing the way they teach and the way students learn.

In regards to their pedagogies, a large percentage of teachers value teacher-led classroom interaction but do not see interaction between learners in the form of collaborative activities as important. Critical thinking and problem-solving are seen as very important skills, which indicates that classroom activities that encourage rich discussion and debates and the knowledge processes of analysing critically and applying creatively should have been highly visible during classroom observations. In addition, teachers' beliefs that classroom activities should reflect learner diversity indicate that learners' lived experiences and prior knowledge should be treated as important classroom resources. This should therefore be observed in the choice of multimodal texts in the classroom.

The next chapter combines the qualitative and quantitative findings and highlight areas of convergence and divergence in the data in order to present a clearer picture of the characteristics of the 21st century secondary school learning environment.

CHAPTER 7: INTEGRATED FINDINGS

7.1 INTRODUCTION

This chapter combines the qualitative and quantitative findings from this study to present a comprehensive view of teachers' appropriation of digital technologies and their pedagogical approaches. This ultimately helped to develop an understanding of the 21st century classroom by answering the main research question:

- What are the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences?

7.2 APPROPRIATION OF DIGITAL TECHNOLOGIES

7.2.1 Access To and Frequency of Use of Digital Technologies

Data regarding access to and use of digital technologies were gathered from teacher interviews, classroom observation of five English and five History classrooms and a quantitative survey. This was used to develop a comprehensive understanding of the 21st century South African secondary school learning environment. Table 7.1 lists the various forms of technologies to which teachers in the five schools have access.

Table 7.1: Access to digital technologies, qualitative and quantitative data

	Qualitative findings	Quantitative findings ≥50% access
Queenstown College	Wi-Fi iPads IWBs Speakers Laptops (MacBooks) Apple Macs Data projectors Lego robotics, Spheros MimioTeach devices	Wi-Fi iPads Laptops Smartphones Data projector IWBs
Duke's College	Wi-Fi Laptops	Wi-Fi Laptops

	Qualitative findings	Quantitative findings ≥50% access
	BYOD (smartphones, iPads, tablets, etc.) IWBs Data projectors Speakers Robotics and coding sets	iPads Smartphones Data projectors IWBs
Hampton High School	Wi-Fi Data projectors Speakers BYOD (smartphones, etc.) Laptops 3D printer Desktop computers (in computer labs) Coding sets	Wi-Fi Laptops iPads Smartphones Data projectors Desktop computers (in computer lab and library)
Southridge High School	Limited Wi-Fi iPads Data projectors Desktop computers (in computer labs) Speakers	Wi-Fi iPads Laptops Smartphones Data projectors Desktop computers (in computer lab)
Baker College	Wi-Fi IWBs Smartphones Laptops Apple Macs iPads Data projectors VR goggles	Wi-Fi IWBs Laptops Smartphones

Table 7.1 shows that the teachers in this study have access to multiple forms of digital technologies. Using Selwyn's (2017) categorisation of such technologies, these include computerised devices like laptops, tablets, smartphones and desktop computers; electronic devices like coding and robotics kits, digital projectors, mimio teach devices and interactive white boards; the systems and applications software like the Windows Operating Systems and applications like Microsoft Teams; additive technologies such as 3D printers and artificial intelligence systems like virtual reality goggles. All the participating schools have computerised

and electronic devices as well as systems and applications software, while Hampton High School also has additive technologies and Duke's and Baker Colleges, artificial intelligence tools. Based on the data, Queenstown College has the greatest access to digital technologies for teacher and learner use.

The qualitative and quantitative data indicate that in the five schools, Wi-Fi, laptops and smartphone access are most common. The quantitative findings also revealed that these are among the most frequently used, along with the data projector. However, teacher smartphone use was observed only once by Marie from Duke's College when she was unable to access the school's Wi-Fi for one of the lessons, prompting her to use the data on her smartphone to access content on YouTube. So, although there is Wi-Fi at Duke's College, connectivity is challenging at certain sections of the school. This led to the History teacher downloading video content prior to lessons and learners having to use their data to access the internet. The problem with seamless Wi-Fi access is one of the reasons provided by the IT Director at Duke's College for their recent technology upgrade. Access to Wi-Fi is also hampered when a large number of learners try to connect at the same time. This was observed on very few occasions at Baker and Queenstown Colleges. Additionally, Wi-Fi is not widely accessible to learners at Southridge High School, as indicated in the qualitative findings.

The teachers at Southridge High School (71%) indicated that they have access to desktop computers, which was confirmed in the interview with the Head of IT, who also indicated that learners can use the computers in the computer labs. The teachers at Hampton High School (67%) also indicated access to desktop computers. The interview data indicated that these are placed in the resource centre and the computer labs. Although teachers at Southridge High and Hampton High schools have access to desktop computers, approximately 39% of teachers from Hampton indicated that they are used frequently, and a higher percentage (53%) of teachers from Southridge indicated frequent use. This was however not observed. On the other hand, very few teachers in private schools indicated that they have access to desktop computers as those schools seemed to have moved away from using desktop computers to use mobile devices, except for the Apple Macs at Queenstown and Baker Colleges that are available for the study of music.

Additionally, the survey data indicated that over 90% teachers in four schools has access to data projectors, which are used very regularly during classroom observations. At Baker College where classrooms are equipped with smartboards, this figure was 45%. Data projectors at this College are placed in larger rooms, like the hall and the atrium, to cater for larger groups, and Lauren, the English teacher, occasionally used these to show videos.

Regarding access to iPads or tablets, over 50% of teachers in every school, except Baker College, said they had access to these. The Head of Innovation, IT services and staff training at Baker College said teachers have to motivate for iPads if they wanted them as these are mainly given to the Mathematics, Accounting and Business subject teachers. iPad use by teachers was observed in five of the 10 classrooms and was used most frequently in Queenstown College and occasionally in Southridge High School as these two institutions provide them as part of school policy. Laptops in the form of MacBooks are also given to teachers at Queenstown College for pedagogical use. The History and English teachers used both iPads and MacBooks in their classrooms. The qualitative and quantitative data revealed that most teachers in Queenstown College use their MacBooks more often than their iPads. The quantitative data showed that laptops are used most consistently by teachers at Duke's and Baker Colleges. This was confirmed in classroom observations. In addition, survey data from Hampton High School indicated that over 90% of teachers has access to laptops and used them consistently. Both the History and English teachers have two laptops, one issued by the school and a personal device; these were used occasionally by the English teacher and about 50% of the time by the History teacher.

Access to IWBs was most common and only observed in private schools. The ones at Baker College are very new and have recently been upgraded. The IWBs at Queenstown and Duke's Colleges are older and have outdated software. The Head of IT and deputy principal at Hampton High School also indicated in our interview that they invested in IWBs about 10 years ago but since they were not being used to their full capacity, they were taken out "*once they came to the end of their lives*". However, 36% of teachers from Hampton High School indicated in the survey that they have access to smartboards, which does not correlate with interview data.

Alice, the History teacher at Duke's, remarked that "*the capabilities of the smartboard are not as great as the ones I had (in a previous school) so I haven't used it at all*". Consequently, the reduced

capabilities of the smartboard meant that in the History classroom it was only used as a presentation device and not for its interactive capabilities. On the other hand, those at Baker College have been upgraded and were used very often but also as presentation devices. At Queenstown College, Tracey, the Head of Innovation, advised that the decision was made not to upgrade their existing smartboards since it had become too expensive and “*software upgrades for the specific model were no longer possible*”. It was thus decided to procure MimioTeach devices to reduce cost and maintain the capabilities of IWBs.

The use of digital technologies in schools requires continuous upgrades, and at times, capital intensive investments to replace obsolete IWBs and technologies since “it is no use having state-of-the-art technology unless it can be sustained” (Department of Education, 2004, p. 10). This suggests that at a time of fiscal constraints and competing priorities, the DoE must continually invest in upgrades for these devices. At the same time, they have to provide new IWBs for those schools that do not yet have access since access to ICT resources and infrastructure is fundamental to the creation of e-schools (DoE, 2004). However, access to digital technologies, though essential for technology integration and the creation of e-schools, does not in itself guarantee that teachers use them effectively in their practices (Buckenmeyer, 2010; Department of Education, 2004). The next section therefore explores the purposes for which digital technologies are used in the five schools.

7.2.2 Purpose of Technology Use

One of the survey questions required teachers to indicate whether digital technologies are changing the way they teach, and the way students learn. According to the responses, 86% of the participants thought digital technologies are changing the way they teach, and 93% responded that these technologies are changing the way students learn. This suggests that teachers perceive that their teaching approaches had changed because of the appropriation of such technologies. Yet, the quantitative findings revealed that digital technologies were overwhelmingly used to search the internet for resources and to prepare lessons, with the highest percentage (97%) at Queenstown College and 83% representing teachers at Hampton High School. However, only 69% of teachers at Queenstown College indicated that they use digital technologies to create their

own resources, which is at odds with the previous figure. This is also surprising since lesson content was uploaded onto the Apple platform that teachers and learners use. Similarly, while 86% of teachers at Southridge High School search the internet for resources to prepare lessons, only 49% indicated that they create their own resources. However, 94% of teachers from Baker College create their own teaching resources using digital technologies, which correlates with the figure of 90% who used the internet for resources to prepare lessons.

Classroom observation also revealed that eight out of 10 teachers curated their classroom resources with other knowledge sources like the internet for video content. Teachers in Southridge High School, Baker College and Duke's Colleges prepared booklets and handouts for learners that included visual and written texts, and in the case of Baker College English class, hyperlinks. Teachers at Queenstown College uploaded multimodal course content onto the iTunes U application. So, while interview data revealed that the History and English teachers at Southridge High School prepared their own learning resources with their respective departments, the quantitative data showed that this was done by fewer than 50% of the teachers at the school. And although the survey data revealed that 64% of teachers at Hampton High School used digital technologies to create their own learning resources, the History and English teachers' main knowledge source was the Grade 9 *Explore* textbook and in the case of the History teacher, World War I history documentaries sourced from YouTube. In addition, 50% of teachers from Hampton High School indicated that they use a learning platform to download or upload material. Again, this was not observed in the History and English classrooms and would have been unlikely in the English classroom as Palesa, the English teacher, occasionally used Microsoft Teams for "*additional enrichment*" as she believed that its frequent use will dissuade learners from listening in class.

The dedicated use of the Apple Platform by Queenstown College as well as the availability of Microsoft Teams for teachers at Baker College allows for greater collaboration and interaction between teachers and learners as well as affords recursive feedback on work that is uploaded onto the platform. The survey data showed that 87% of teachers at Baker College and 77% of those from Queenstown College use the platforms. During classroom observations, the History and English teachers used the Apple platform mainly as a repository for curated course content

and for monitoring and administration but did not harness the wide range of affordances made possible by the platform. Learners would either type their work on their devices and then print for submission, or in the majority of cases, write on paper and submit hard copies to the teachers. For example, in one of the Grade 9 English lessons at Queenstown College, learners were required to create short stories, which they did mainly in their notepads after which they each took turns to write their stories on the whiteboard. However, had these stories been typed onto their iPads, they could have been shared via the learning platform and projected onto the whiteboard, thereby creating more time for classroom discussion.

In all the schools surveyed, less than 50% of teachers responded that they provide feedback using technology. This is despite the fact that between 62% and 76% of teachers responded in the survey that they post homework and assignments for learners. During observations, particularly in the English classrooms at Baker and Queenstown Colleges, teachers referred to work that was emailed to learners. Although Duke's College had created its own Moodle, it was mentioned once by the History teacher who had uploaded her lesson content onto the platform, but it was not clear if learners used it regularly. The IT Director criticised the various capabilities of Moodle and described it as "*clunky and old-fashioned*", saying that he preferred the Google platform, which was used extensively by Marie, the English teacher. She was the only teacher who exploited many of the affordances and technological capabilities of the various technologies available to her and the learners. She created a Google Classroom for her English class and learners were required to upload and submit their assignments via the platform. She was also used apps like Quizziz and Classcraft, which were uploaded onto the Google platform to facilitate monitoring of learners' activities. By creating a quiz using Quizziz, learners were able to get their scores immediately and were then allowed to redo the quiz to improve their scores. The teachers at Baker College (69%) also indicated that they used apps to present lessons, although this was not observed. The IWBs in the History and English classrooms afforded the possibility of integrating various applications to enhance the interactivity of lessons. However, these were not exploited as the smartboard was used as a presentation tool only.

The accessibility of a digital teaching and learning platform like Google and Apple platforms equally provides opportunities for blended learning. However, blended learning activities were

very rare. The quantitative data revealed that despite access, 68% of teachers at Baker College and 51% of teachers at Queenstown College responded that they provide opportunities for blended learning. With the latter school, Tracey, the Head of Innovation, advised there are occasional flipped classroom days where “*lessons are uploaded onto iTunes U or emailed to the girls*”. These flipped classroom occasions usually occurred once per term for teacher learning activities or during a big event at the College.

During Lauren’s absence on one occasion, learners at Baker College were asked to complete an online task that required them to work synchronously on language revision exercises using Digibook, the online version of *The English Handbook and Study Guide*. These activities were graded immediately, providing recursive feedback for learners. Apart from the Quizziz task provided by Marie from Duke’s College, this was the only other example of a synchronous learning.

Interview data suggest that there are technology champions, like science teachers, who use digital technologies in transformative ways in their classrooms. For instance, in Baker College the Head of Innovation mentioned that a particular English teacher allows learners to create animations using their devices. An example of the transformative use of technology in the sciences was mentioned by the Head of Innovation at Queenstown College who indicated that sphero bolts, which are spherical robotic devices, are used in life sciences for coding for instance, to trace blood circulation around the body. In addition, it is evident that in private schools in particular, digital technologies are used in transformative ways for special activities and projects. This is based on interviews with the Heads of Innovation of some schools. For example, one of the activities undertaken as part of the Grade 9 English programme at Queenstown College required learners to collaboratively create short advertisements using their iPads and other available technologies. Although this activity was not observed, some of the advertisements were viewed on the school’s Facebook page and in their online newsletter. Similarly, during one of the PLC meetings at Baker College at which different schools were showcasing learners’ use of digital technologies, one of the out-the-box activities created by a group of learners at the College was observed. This was a short stop-go animation on iPads to highlight the issue of gender-based

violence. These activities also demonstrate the harnessing of multiple affordances like collective intelligence, active knowledge making and interactivity.

In conclusion, the qualitative findings were confirmed to some extent in the survey data, indicating that the transformative use of digital technologies in the classroom was not a regular occurrence. There were also instances where survey findings did not match qualitative data. This was particularly the case for Baker College, whose survey findings suggested that teachers use digital technologies for lesson planning and to teach, including to provide opportunities for blended learning. However, this was not observed. Nevertheless, since only two teachers' lessons were observed out of 36, the two teachers might have been outliers. Similarly, between 50% and 60% of teachers at Hampton High School indicated that they use a learning platform, create their own teaching resources, and use apps to prepare lessons, but in both of the classrooms observed, the textbook was the main source of information.

7.3 TEACHERS' PEDAGOGICAL STRATEGIES

This section explores teachers' pedagogical approaches with qualitative findings as the main data source. The responses from the survey questions asking teachers to comment on patterns of interaction in their classroom were also used. The four patterns of interaction are teacher-student, teacher-student-content, student-student and student-content. These have been combined with the four knowledge processes (experiencing, conceptualising, analysing and applying) to understand teachers' pedagogical approaches.

One of the questions in the quantitative survey required teachers to indicate how frequently the different modes of interaction occurred in their classrooms. The results were combined with classroom observation data about teachers' pedagogical approaches to get a clearer picture of their overall pedagogical moves.

The survey findings revealed that teacher-student interaction occurred most frequently, followed by teacher-student-content interaction, and that the least frequent interaction was student-student interaction. This was corroborated to some extent by the observation data, which also

revealed that teacher-student interaction was the most dominant form of interaction in the classrooms observed and occurred at a high or medium level. However, classroom observations revealed a more diverse mix of interactions.

Medium to low levels of teacher-student interaction with no other mode of interaction and lasting for the duration of an entire lesson was observed in teacher-centric lessons where there was minimal or no learner interaction. This was typical of Natasha's History lessons and to some extent Mariette's English lessons at Southridge High School. In Natasha's lessons, learners' voices were rarely heard as the teacher dominated the discourse, and in Mariette's lessons, there was minimal learner interaction usually characterised by one-word answers and brief sentences by very few learners. Anderson and Garrison (1998) associated this type of interaction at medium to low levels with teacher-centric pedagogies.

On the other hand, high levels of teacher-student interaction generally reflected active learner engagement, which was linked to the knowledge process of conceptualising. The sequence that was observed is "initiation, response, evaluation" (Cazden, 2001, cited in Cope & Kalantzis, 2015), where the teacher poses a question or initiates a discussion, the learners respond, and the teacher evaluates the response and provides clarification or correction. This was typical of the teacher-student engagement in Stacey's History classroom and occasionally in Mariette's English classroom. Although learners participated in these interactions, they rarely initiated questions.

High teacher-student interaction, linked with the knowledge processes of experiencing and conceptualising, were often evident in Liselle's English lessons. These interactions reflect a backward and forward movement that Kalantzis and Cope (2017) stated is characteristic of effective pedagogy. In these instances, the teachers drew on learners' lived experiences, prior knowledge or examples from popular culture to guide learners to understanding new concepts. One example of this occurred during a lessons in which students were learning about the structure of a short story. Liselle referred to learners' senses and experiences of Durban and Johannesburg by asking them to describe what they saw and felt. After providing their responses, she remarked, *"Do you see how we're describing the setting?"*.

High teacher-student interaction accompanied by student-content interaction at a medium or low level or the converse pattern was observed in several classrooms. This occurred when the teacher engaged learners in the process of conceptualising and then showed a video for learners to experience an event and to evoke emotion. This was observed in Stacey's History lessons as students watched a brief World War II documentary. There was also evidence of high teacher-student interaction accompanied by medium or low student-content interaction which reflected the two knowledge processes of conceptualising and applying where learners were given the opportunity to apply the knowledge gained during the conceptualising process to do a brief individual task. This was observed in one of Cathy's History lessons during a discussion of the topic of Revolutions. After introducing the topic and various concepts relating to revolutions, learners were given a brief task to complete.

In very few English lessons, usually related to poetry, there was medium level teacher-student interaction with medium level student-content interaction with the knowledge processes of conceptualising, analysing and applying as learners applied their knowledge of poetry structure learnt in the conceptualising process while engaging in functional analysis. Medium level teacher-student interaction reflects the active engagement of learners, but this lasted only about 50% of the lesson time.

Teacher-student-content interaction was ranked the second highest in the survey. There was a weaving backward and forward between teacher-student-content interaction and teacher-student interaction as teachers moved between modes where in the process of conceptualising, the teacher and learners also applied critical thought to the discourse. The following combinations were therefore observed: low teacher-student with high teacher-student-content interactions representing the knowledge process of conceptualising and a greater focus on analysis and joint meaning-making; high teacher-student interaction with low teacher-student-content interaction, indicating less analysis and more conceptualising; or medium teacher-student interaction and medium teacher-student-content interaction, with an equal mix of conceptualising and analysing.

Teacher-student-content interaction did not occur without the presence of other modes of interaction and always occurred with teachers weaving between different knowledge processes.

Therefore, the combination of teacher-student and teacher-student-content interactions was usually observed with conceptualising, analysing and experiencing, or in a few cases, conceptualising, analysing and applying. The teacher first explained concepts providing examples from learners' lived experiences to scaffold learning of comprehension of concepts, and learners then posed questions and provided references from their lifeworlds. One example of teacher-student and teacher-student-content interaction was observed in Palesa's praise poetry lesson. In the processes of conceptualising, experiencing and analysing, she drew on learners' lived experiences of African culture to help learners make sense of the poem. During the process, learners expressed the view that they did not identify with the poem since they believed that praise poetry was not poetry. The processes of analysing and experiencing continued. This type of pedagogical blend was observed in every classroom except in Natasha's History classroom and very rarely in Mariette's English classroom, although 92% of teachers at Southridge High School responded that teacher-student-content interaction occurred very frequently, and 100% of them indicated that critical thinking was an important skill. However, this conflicted with classroom observation data as opportunities for learners to analyse critically and functionally were rarely observed in this high school.

In very few cases, and only in two private schools, Queenstown and Baker Colleges, the four knowledge processes and modes of interaction were evident. In these instances, none of the modes of interaction occurred at a high level but at least one took place at a medium level without downgrading the learning experience. For example, in one History lesson, William and the learners discussed the concept of land reform (teacher-student), and in their discussion began to analyse what this meant in the South African context (teacher-student-content). Afterwards, learners were asked to first analyse individually a newspaper article on the issue of land reform in Zimbabwe (student-content) and then to discuss their answers with a partner (student-student). William walked around to each group to listen to and comment on their discussions. This active knowledge making process involved the process of conceptualising, analysing, experiencing and applying.

Student-student formal interaction was the least frequent of the interactions. Consequently, opportunities for learners to work collaboratively or as a group were less frequent in most of the

classrooms observed. This also reflected the views of teachers, particularly from Southridge High School and Duke's College as well as the English teacher from Baker College, that collaboration is not an essential skill. For example, Alice from Duke's College remarked that "*with the sort of the move towards a more technological environment, collaboration seems to be less of an important skill*". There was one example of high student-student interaction in one of her lessons when learners worked in pairs to create spider diagrams to summarise information in their handout. This represented the process of conceptualising. On the other hand, 97% of teachers at Queenstown College, which had implemented an integrated curriculum, indicated in the survey that student-student interaction occurred frequently. This was confirmed in observation in the English classroom during activities involving medium student-student interaction as learners jointly created short stories. There were also two examples of student-student interaction in Palesa's English classroom. In both instances, student-student interaction followed a period of teacher-student and/or teacher-student-content interactions. In addition, in both of these classrooms, like in one of Marie's lessons, learners were allowed to choose if they wanted to work individually or with a partner. Consequently, student-student interaction was combined with student-content interaction, which reflects the knowledge process of applying.

High student-student interaction occurred in Cathy's History classroom as learners applied knowledge learnt in the conceptualising process to two collaborative multimodal assessment tasks, for example, their flash mob protest activity. High student-student interaction also occurred in one of Lauren's English lessons as well as in William's English lesson as learners worked together to conduct internet research for subsequent class discussions. Frequent student-student informal interaction around technology at Duke's College was an impediment to effective learning as learners were off-task and engaged more with non-pedagogical content in the form of online games.

Student-content interaction occurred with the least frequency at Hampton and Southridge High Schools, as indicated in the quantitative data. This involved learners at Southridge High School writing summative assessments, or in the case of the English classroom at Hampton High School, learners passively watching a movie for film study or passively copying chapter summaries. Student-content interaction in the History classroom at Hampton High School also involved

learners making notes. Additionally, in one of the English lessons at Duke's College, learners spent an entire lesson watching music videos of the poems to be studied for poetry. Using Anderson's (2003) interaction equivalency theory, the passive viewing of a movie for film studies or music videos for a poetry lesson and with no teacher engagement, though occurring for an extended period of time, must be described as medium to low student-teacher interaction.

A possible impediment to teacher-student-content and student-student interactions in high schools is the extensive CAPS curriculum and the amount of content that needs to be covered by teachers. This reduces the amount of time available to teachers to interact and discuss with children. The above issues were raised by the principal of Southridge High School who lamented the amount of learning "imposed upon schools". Additionally, the timing of observations which occurred just before examination periods in the two high schools, could have also influenced findings. During this period, teachers were preoccupied with covering content to prepare learners for their examinations and needed to ensure that they had completed summative assessments. Consequently, there was a lot of focus on what was 'coming in the exams'. Hence, the frequency of teacher-student interactions.

In summary, data indicate that teachers whose pedagogical strategies reveal a blend of modes of interaction, even with some occurring at a medium or low level and combined with a blend of knowledge processes which include the knowledge process of experiencing, demonstrated transformative pedagogical strategies. The use of a single mode of interaction, like teacher-student interaction or student-content interaction with one knowledge process generally indicates passive learner engagement and usually teacher-centric strategies.

7.3.1 Harnessing learners' epistemological diversity

The question on teachers' pedagogical choices also examined the ways teachers' pedagogical choices harnessed learners' epistemological diversity. It describes the harnessing of learners' interests, lived experiences including with technologies, ways of being and prior knowledge, encouraging learners' participative agency. This was examined as an aspect of the knowledge process of experiencing. One of the survey questions required teachers to indicate whether they believed classroom resources and activities should reflect learner diversity, and another asked if

the classroom should reflect the real world. A mean of 94% indicated that the classroom should reflect the real world, and 97% of teachers responded that it should reflect learner diversity, thereby suggesting that activities should be as authentic and diverse as possible. In the interviews, teachers generally agreed that it is important for the classroom to reflect learner diversity. However, Lauren from Baker College argued that it was *“quite a learning curve”* since *“you kind of feel that you’re straddling two worlds in terms of what’s still relevant and what isn’t and what you should be hanging on to and what you should be changing”*.

Classroom observations, however, revealed that teachers, except for those at Southridge High School, tried to ensure that learners’ lived experiences and interests were reflected in their discussions. The choice of English text *The Hobbit* as a literature text did not seem to reflect the diversity of the class, and hence, appeared not to engage learners, who seemed disinterested in discussions around the text. Their inability to identify with the text could explain why learners scarcely participated in discussions, which prompted Mariette to exclaim, *“Can you please self-motivate!”* In her justification of the choice of text, she indicated that the text was chosen based on what she and the other English teachers in the department believed would appeal to learners. Learners’ voices were silent in the History classroom as they were only allowed to speak when permitted by the teacher. By preventing learners from engaging freely in lessons, learners’ participative agency was not valued in the History classroom at Southridge High school. As Van Haren (2010) stated that learner diversity is enhanced when they are allowed to discuss, share ideas and develop their perspectives.

On the contrary, Marie valued learners’ epistemological diversity in her diverse song choice for her protest poetry lessons as learners were allowed to choose the poem they wanted to research and study. Learners’ choice and use of technology were not restricted as Marie stated in our interview that she wanted to allow learners more freedom of choice. The importance of choice was also highlighted by Lynne, the principal at Queenstown College, who indicated that in the contemporary classroom, learners must be allowed to choose whether to use digital technologies or not. Palesa’s pedagogical practices at Hampton High School also recognised learners’ diversity as a classroom asset. Learners’ voices were privileged as classroom interactions were not regulated. The choice of text, *The No. 1 Ladies’ Detective Agency*, set in Botswana, allowed for

rich discussions based on topical issues. However, some of these issues only appealed to female learners or those of a particular ethnicity, which meant that for a few topics some learners' voices were silent. However, some of the visual texts in the English *Explore* textbook, like *Gone with the Wind* and *Breakfast at Tiffany's* seemed alien to the Grade 9 learners' lived experiences and interests. For this reason, they participated less in these discussions and one learner stated that she found it boring. Similarly, the two praise poems posed a similar challenge as learners said they could not identify with them despite them being African poems. In these instances, it was difficult for learners to identify with the texts, but in the latter instance their interaction never waned. In our interview, Palesa stated, "*I find that Eurocentric is easy for them. African literature tests them a little bit. They know it because it's everything that they see*". However, this seems to contradict their earlier response to *The No.1 Ladies Detective Agency*.

William's History classroom was an example of learners' interests and lived experiences being incorporated to enrich the learning experience. This was demonstrated in the inclusion of Zimbabwe and issues of land expropriation in the History syllabus because these are topics that were not previously included. To explain its inclusion William stated the following:

We've changed a lot of curricula based on what pupils have said. Pupils have said we want to learn more about African countries. So, we've introduced something on Zimbabwe that we would never have taught in Grade 9 before.

However, although learner agency was largely valued at Baker College, the restriction of technology use by William and Lauren infringed on learner agency. Tarling and Ng'ambi (2016) found that such restriction and regulation usually occurred in teacher-centric environments. However, the English and History classrooms at Baker College were exceptions in this regard.

In the History lessons at Queenstown and Duke's Colleges, the topics focused on revolutions and World War I, but the teachers were still able to harness learners' prior knowledge to help them understand some of the issues being discussed. For example, Alice and learners from Duke's College drew on the current global political situation during the time of President Trump to help learners understand the use of propaganda in World War I. Learners also drew on their own lived experiences to make sense of issues like conscription and disease and illness in the war.

Liselle from Queenstown College also used the knowledge process of experiencing the known to make sense of the new as she exposed learners to a diverse range of short stories, including South African stories. Her choice of a short story rap engaged learners and helped enrich the learning experience. She often referred to aspects of learners' experiences and their environment to facilitate the learning of new content. However, her constant references to teen literature, like the Harry Potter series, to explain aspects of a short story, excluded some learners who seemed unfamiliar with the stories.

It is evident that from the data, teachers in the majority of schools incorporated learners' lived experiences, prior knowledge and to a lesser extent, their experiences with digital technologies.

7.4 SUMMARY OF INTEGRATED FINDINGS

In this chapter, the results from the qualitative findings were merged with the quantitative data to find areas of convergence and divergence in order to answer the research questions. Both the qualitative and quantitative findings regarding the appropriation of digital technologies confirmed that teachers had access to numerous computerised and electronic devices for teaching and learning. However, despite their access, digital technologies were mainly used in classrooms for representative purposes with only a few examples of generative use. This confirms the quantitative data that showed that the dominant use of digital technologies by teachers was for lesson preparation. However, interview data indicated that teachers in private schools appropriated digital technologies in transformative ways in Mathematics and Science classrooms and in special projects. This suggests that teachers were not harnessing the plethora of digital affordances, confirming a comment made by the principal at Baker College that such technologies are not fully integrated in all classrooms.

This study found that transformative pedagogical strategies are generally associated with teachers who frequently blend knowledge processes and modes of interaction, thereby encouraging active learner participation and harnessing the lived experiences and interests of learners. Traditional pedagogical approaches are linked to the use of fewer knowledge processes and modes of interaction with less learner engagement.

CHAPTER 8: DISCUSSING THE FEATURES OF THE 21ST CENTURY SECONDARY SCHOOL LEARNING ENVIRONMENT

8.1 INTRODUCTION

This study sought to investigate the characteristics of the 21st century South African secondary school learning environment that provide rich learning experiences by examining teachers' appropriation of digital technologies in the five participating schools as well as their pedagogical strategies, which included the way in which teachers' pedagogical choices harness the epistemological diversity of learners. This chapter discusses the findings related to the first sub-question on teachers' appropriation of digital technologies and then examines teachers' pedagogical approaches. Finally, the main question about the characteristics of the 21st century learning environment, is answered.

8.2 SUB-QUESTION 1

- In which ways have digital technologies been appropriated within the classroom to transform teaching and learning?

Findings reveal teachers' intentional use of digital technologies to create authentic learning experiences for students. The importance of authentic learning activities was emphasised by (Anderson, 2003a; 2004; Cope & Kalantzis, 2015). This was evidenced particularly in History classrooms through the streaming of World War 1 and 11 YouTube documentaries in Duke's College and Hampton High School as well as videos depicting events immediately preceding the 1994 elections in South Africa by Baker College's Grade 9 History teacher. In these instances, teachers used the information and experience of the videos to generate class debate and for subsequent homework activity. Although technology was used in a representative sense, the subsequent class debate resulted in the generation of ideas, which led to active knowledge making. In this case, representative use was combined with generative meaning-making.

The ubiquity of digital content allowed teachers to access diverse and multimodal sources of information that moved beyond the teacher and textbook as the only sources of valid knowledge.

The use of digital technologies to source diverse songs for poetry in the Grade 9 English lessons at Duke's College allowed learners to experience poetry as a multimodal activity. Though technology was again used in the representative sense, the affordances of multimodality and diversity were harnessed and allowed learners to select a poem related to their interests. This led to discussions about the chosen poems.

The use of the internet to conduct research for class debates was one way to combine the representative use of technology with a generative activity. One of the lessons in which this was observed was with the introduction to Shakespeare's *Twelfth Night* where learners harnessed the nonlinearity of the internet to search for diverse sources of information for their task. This representative activity led to the generation of rich ideas and thoughts that helped enrich the learning experience.

The dedicated use of the Apple platform by Queenstown College, for administration and monitoring and to upload lesson material, which learners downloaded for easy access, was an important use of a digital teaching platform. In this way, learners were able to access and retrieve teaching resources that were curated by teachers. The use of digital teaching platforms was cited by Dede and Richards (2012) as a means of using disruptive technologies to move beyond the industrial-era schooling system. However, the various affordance capabilities of the platform were not sufficiently harnessed since the application was not used in innovative ways and for learners to create content.

Blended activities through the flipped classroom approach also occurred at Queenstown College as was mentioned by the Head of Innovation of the college. Tasks were either emailed to learners or uploaded onto the Apple platform. However, this only occurred once per term and was not a regular occurrence.

Opportunities for learners to learn about technology were rare but this was observed in one Grade 9 English classes at Duke's College. In setting up Google Classroom for her class, the teacher realised that some learners were not familiar with the platform and did not know how to use it to upload their work. Being an expert with high computer self-efficacy (Sang et al., 2010), the teacher conducted a computer literacy lesson on how to use the platform, providing

contextualised learning for students, which Jonassen (1996) highlighted as the most effective way to learn about computers. Another example of the contextualised learning about digital technologies was not observed but was mentioned in one of the interviews with the Head of Innovation of one of the schools. This related to teaching learners how to use Office 365 Excel in the context of learning how to prepare budgets for their Consumer Studies lesson.

The data largely revealed that learners and teachers were technology consumers and not producers nor designers of knowledge, terms with Kalantzis and Cope (2010) used to describe teachers and learners in the digital age. Teachers mainly employed traditional methods with new technologies which were used as “representations of experience” (Hokanson & Hooper, 2000, p.538). There were very few instances of digital technologies being used by teachers and learners in transformative ways in the classrooms observed although, there was evidence of their generative use for special projects in some private schools. Additionally, the introduction of robotics and coding as well as the introduction of VR goggles in some schools also shows that newer forms of digital technologies are being appropriated in schools to enhance learning. The example of sphero balls being used for Life Sciences at Queenstown College shows the transformative use of newer technologies to transform teaching and learning.

Generative uses of digital technologies to transform teaching and learning were therefore isolated events as digital technologies were being used in the schools observed mainly as supplemental teaching tools and as add-ons. So, despite increased access to multiple forms of digital technologies in classrooms, findings from this study relating to their use generally resonate with those in literature and confirm that providing access to digital technologies does not guarantee that teachers integrate them (Marcinkiewicz, 1994, cited in Buckenmeyer, 2010).

Teachers’ representative use of digital technologies indicates a possible lack of awareness of their affordances, and hence, a lack of affordance actualisation (Strong et al., 2014). Teachers therefore need to pick up information about the various affordances to guide their actions (McGrenere & Ho, 2000) since an affordance cannot be acted upon unless it is perceived (Hammond, 2010). Ng’ambi (2013) posited that an awareness of the many affordances is a strong predictor of teachers’ use, and this was observed with Marie at Duke’s College who was au fait with the affordance capabilities of the technologies to which she had access. Teachers’ failure to

harness the action possibilities (Hammond, 2010) of the technology can also be linked to inadequate teacher learning activities. The following subsection looks at some of the barriers to technology use that might explain teachers' lack of transformative use in their practices.

8.2.1 First- and second-order barriers to teachers' technology use

Ertmer (1999) listed two types of barriers that prevent teachers from using and integrating digital technologies in their classrooms. First-order barriers are extrinsic to teachers and institutional and contextual, and second-order barriers are intrinsic to teachers and relate to their beliefs.

One of the extrinsic barriers to teachers' use of digital technologies and which has often been cited in studies in the South African context (Du Plessis & Webb, 2012; Padayachee, 2017) is the lack of learner access to digital technologies for personal use, and more importantly, a lack of out-of-school access. This was evidenced in Southridge High School where learners did not have continuous access to Wi-Fi except in the computer laboratory. Anton, the principal indicated the following:

You've got some children coming from wealthy families and others not from wealthy, and it does have an impact in terms of education because the children from the wealthier families have got all the resources ... whereas your less privileged children have found it very difficult without the support and the kind of resources that the wealthier families have had.

Stacey from Hampton High School shared a view similar to Anton and stated that the reason she had not used Microsoft Teams often was because the kids who lack technological access would be at a disadvantage and she did not think that it was fair. She added the following:

Working at a government school and the different demographics that we have of the kids, it's difficult cause not all the kids have access to internet connections at home or to even stable electricity. So, it's a challenge with them having to charge their devices and stuff. Ideally, what I would like to do is to flip the classroom, so to not do any teaching in the class but for them to do the self-studying at home and then do more discussions in class.

It is evident from Anton's and Stacey's comments that the digital divide between learners who are from well-resourced backgrounds and those who lack basic technological access contribute to the reluctance to appropriate digital technologies more frequently in class.

Stacey referred to learners' lack of computer skills as another deterrent to technology integration in her classroom because a number of learners are growing up without digital access and do not know how to use computers. They also do not have any opportunities to learn *about* computers since, as she indicated, the focus was on coding. However, Paul, the Head of IT, indicated that along with coding, learners also received ICT lessons although he specified training in how to access emails and Microsoft Teams. Technology trends like coding and robotics seem to be the attraction for schools even those with limited resources who are opting to procure expensive coding and robotics equipment for a minority of students while the majority of learners in those schools have limited in-school and out-of-school digital access. The result could be a growing digital divide not only between technology-rich schools and those with less technologies but also within schools themselves.

Both the survey and interview data showed that government schools have computer labs with desktop computers that are generally used by learners studying CAT and IT. Desktop computers are also available in the media centre at Hampton High School. This was mentioned by Paul, who indicated that learners are allowed to use these devices after school if they have no internet at home. This suggests that a lack of access to digital technologies outside of school should not prevent Stacey or other teachers from uploading tasks on Microsoft Teams or assigning activities that require learners to be connected. The bigger deterrent might therefore be a lack of computer literacy skills.

As our interview progressed, Stacey made other comments that suggested intrinsic biases that may prevent her from using digital technologies more frequently. She indicated that while technologies do occasionally enhance the lesson, *"other classes I absolutely hate using it because it just spirals them into chaos"*. When asked to explain further, she added the following:

They sort of get the impression that now we're watching a video so it's free time, we don't have to focus on it. We can do whatever we want. So, they switch off when they see the data coming on rather than focusing more.

These comments suggest that there may be challenges with class control, which is an issue that was also raised by Marie and Alice from Duke's College and perhaps an issue that requires further study.

An extrinsic barrier that has generally been overlooked is the lack of pedagogical vision of school principals who themselves have not been adequately prepared to lead technological pedagogical transformation in schools (Flanagan & Jacobsen, 2003; Hew & Brush, 2007). Consequently, these leaders' perceptions and beliefs about teaching and learning remain traditional and a hindrance to teachers' integration. For example, Anton's view that it is not necessary for learners to be online at the same time as it will reduce teacher control, may be a tacit reason why only learners who study CAT, IT and Engineering Graphic Design are allowed to use the school's Wi-Fi and the computer laboratories. His question, *"When everything becomes digital, then you'd start asking yourself why do we need then to go to school when we could all sit in front of a computer?"* suggests a very traditional view of the integration of digital technologies. Anton also believed that only learners who are good at Mathematics and *"the mechanics of IT"* are equipped to learn with computers.

The qualitative findings also revealed that a lack of shared understanding and vision for technology use between school leadership, the Head of IT and teachers could be an obstacle to teachers' appropriation of digital technologies. This was noted in Hampton High School and Duke's College. For example, Paul, the deputy principal and Head of IT at Hampton High School, articulated a vision of technology integration where teachers and learners connect and collaborate more in the digital space, but George, the principal, stated that he was more *"chalk and talk"* and did not see *"the classroom itself changing significantly"* in the future. On the contrary, the principal and staff at Baker and Queenstown Colleges articulated a shared pedagogical vision and shared a common understanding of how to prepare learners to be future-ready. However, this alone did not seem to persuade Lauren and William at Baker College to use technology in transformative ways in the classroom since their intrinsic negative beliefs appeared

to be obstacles. As Ertmer and Ottenbreit-Leftwich (2010) argued, there is the need for a change in mindset in favour of seeing digital technologies as important teaching and learning tools.

Despite access to continuous teacher professional development activities and being Microsoft certified educators, William and Lauren, like many other teachers in this study, focused on learning *from* technologies. The various affordances of the available technologies and the action capabilities of the state-of-the-art Promethean IWBs were not harnessed. So, rather than transforming their pedagogy, the IWBs were assimilated into the teachers' existing ways of working since teachers are likely to make sense of newer technologies based on previous experiences of older technologies (Armstrong et al., 2005). In fact, during our interview Lauren remarked, *"I don't use technology to the same extent as some other people do"*. She added, *"I still expect there to be a huge amount of verbal communication and discussion"*. Furthermore, although each learner owns a laptop as part of the school's technology policy, its use was not encouraged in class because Lauren said, *"I don't want people to be hiding behind their laptops. I want them to be involved and engaged"*. Lauren's comments confirm the findings in previous studies (Du Plessis & Webb, 2012; Ertmer, 1999, 2005) that teachers' beliefs are barriers to the effective integration of technology. Hermans et al. (2008) posited that teachers enter the learning environment with their own beliefs and theories about how students learn, and these beliefs influence the judgements about which mediational tool to use and which pedagogical strategies to adopt. Sutherland et al. (2004) had a similar perspective and cited "bottom-up influences" relating to teachers' histories of learning and their beliefs that influence their classroom practices with ICTs. Lauren's perception of the use of digital technologies is therefore linked to her culture of teaching English and her perceptions of what counts as good learning in the English classroom with the view that digital technologies would interrupt meaningful learning in the English classroom.

There was also evidence of teachers' beliefs being a barrier to the appropriation of digital technologies in their classrooms in the interview with Palesa from Hampton High School and William from Baker College. Palesa articulated the view that digital technologies would detract from the learning experience as learners need to be able to engage with the text, and not a multimodal text but the physical hardcopy, as they need to *"feel the paper"* to be able to engage

with what they are reading. This view reflects a limited and traditional view of what constitutes a text in the contemporary classroom.

William believed that laptops are generally distracting for learners since it is not useful for them to use their devices only to take notes. Consequently, apart from one occasion when learners were allowed to use their laptops in his History lesson, he provided no other opportunities for them to use their devices meaningfully. Technology use by learners in William and Lauren's classrooms was therefore "regulated and restricted to the priorities of the teacher" (Tarling & Ng'ambi, 2016). Additionally, their negative perceptions about technology use did not change with the increased learning opportunities available to them.

Nevertheless, the negative beliefs articulated by Lauren and Palesa and perhaps William, suggest that these could be linked to inadequate training in the use of digital technologies. William and Lauren had access to weekly teacher training in the use of digital technologies, but these were usually 'ignite' sessions focused on technology trends and not specific to teachers' needs. In the case of Palesa, teacher training was sporadic and insufficient, and therefore, not enough time is spent learning how to harness the affordances of the technologies. Consequently, if teachers are not given enough time to learn and change their beliefs, they resort to what is already known (Buckenmeyer, 2010). Angeli et al (2015) blamed teachers' lack skills to teach effectively with technology on a focus on teaching technical skills without teaching how technology interacts with pedagogy and subject knowledge. Koehler et al (2013) criticised the decontextualised, one-size-fits-all approach.

Unlike Lauren and William, Marie demonstrated high computer self-efficacy (Sang, et al., 2010) as she provided opportunities for learners to learn *with*, to learn *from* and to learn *about* computing (Jonassen, 1996) when teaching them how to navigate Google Classroom and attach files. This contextualised way of learning *about* computing was equally employed at Queenstown College. Instead of the subject teacher providing computer literacy skills, there was collaboration with the Head of Design and Innovation who provided the training required after which learners would apply the skill in their respective classes. Although Marie appeared to be a champion of the use of digital technologies, a term used by some principals and teachers, and her beliefs about the use of digital technologies seemed more positive, she stated that she was not "*a massive fan*

of the excessive use of digital technologies". This confirms findings by Liu (2011) in a study of Thai teachers' practices, that there is a disparity between teachers' beliefs about technology use and their appropriation of such technologies in the classroom. Marie also explained that she has received little formal training in their use but had figured things out herself, demonstrating high computer self-efficacy (Neugebauer et al., 2019; Sang et al., 2010). The above examples demonstrate that teachers' appropriation of digital technologies is perhaps more complex than initially perceived.

8.2.2 "Phones are an obstacle in the classroom"

Another belief that negatively influenced teachers' use of digital technologies was the view that smartphones in particular are obstacles to learning. This view was expressed by Marie, who used technologies most frequently in the classroom and experienced the greatest distractions from smartphones. Alice, the History teacher from the same school, shared a similar perspective and frequently referred to smartphones and iPads as a problem because learners were generally off-task. This points to a possible conflict between teachers' and learners' perceptions of the affordances of the smartphones, an issue raised by Downes (2002, cited in Hammond, 2010), and it suggests the need for a shared understanding about their use and perhaps a change in teachers' mindsets about their action possibilities.

The view that smartphones are a distraction was especially associated with the teachers in private schools. This perspective was also articulated by the principal of Southridge High School who expressed the general belief that should learners be allowed unrestricted access to Wi-Fi and digital technologies, they will be distracted and teacher control would be hampered.

Learners at Queenstown College were also not permitted to use smartphones in the classroom even when they forgot their iPads at home. This was observed in the History as well as English classrooms. The Head of Innovation advised that this policy was in place because "*notifications are a distraction*".

Likewise, the English teacher at Baker College stated that "*technology can be distracting for them. Lots of kids are distracted by their cell phones and similarly their laptops*". The History teacher

explained that the school's policy was that *"pupils may not use their phones without the permission of the teacher"*. In fact, he stated that *"some teachers want them banned"*. He also expressed that his *"big issue with the smartphone"* was that learners' entire lives are on their phones and notifications tend to disturb their focus in class.

Yet, on the few occasions when learners were allowed to use their smartphones in their English lesson at Baker College due to poor Wi-Fi connectivity, they seemed fully engaged with their tasks. This suggests that learner engagement may be related to the nature of the task.

While Duke's English lessons were an example of the disruption to teaching and learning caused by learners seemingly being distracted by their smartphones, the decision to restrict or forbid their use in the classroom could deny opportunities for the harnessing of their various affordances for pedagogical purposes. Among the affordances of smartphones, and in particular m-learning, is facilitating anywhere, anytime student-centred learning (Cochrane & Bateman, 2010). The examples of cell phone use in Lauren's English lesson and in Marie's when there were problems with Wi-Fi connectivity demonstrate the benefits of smartphone use in providing quick access to online resources which allows for the continuation of pedagogical activities.

In conclusion, the findings generally revealed an under-utilisation of the digital technologies at most of the schools in the study as well as missed opportunities for their use. In private schools in particular, it is evident that in many instances digital technologies were being used as an add-on (Tarling & Ng'ambi, 2016) or as a supplementary teaching tool (Ertmer & Ottenbreit-Leftwich, 2010) and only being used in creative ways for special projects, in science and mathematics and by some technology champions. To some extent, the findings about the lack of integration of digital technologies confirm the findings in literature that there is disparity between expectations and teachers' practices involving their use. The under-utilisation of the available technologies and the harnessing of their affordances point to some extent to the inadequacy of teacher learning activities, particularly in Baker College and Hampton High School. In the first instance, notwithstanding the weekly opportunities to learn about digital technologies, the focus seemed to be on technological trends and not on how these technologies can effectively transform teachers' pedagogies.

Apart from the transformative use of digital technologies, teachers' pedagogical strategies are even more significant indicators of the transformation of their practice. The next section focuses on the pedagogical strategies of the teachers in the study.

8.3 SUB-QUESTION 2

8.3.1 Which pedagogical strategies do teachers need to employ in order to produce rich learning experiences in the contemporary learning environment?

McLoughlin and Lee (2007) argued that an expanded vision of pedagogy is necessary if learners are to become active co-producers of knowledge. This study combined Anderson's (2003a) interaction equivalency theorem and Cope and Kalantzis' (2015) knowledge process to create an expanded vision of pedagogy. Literature (Fataar & Norodien Fataar, 2021; Padayachee, 2017; Tarling & Ngambi, 2016) pointed to weaknesses in teachers' pedagogical strategies which are viewed as impediments to the transformation of their practices. Additionally, rich learning experiences as defined in this study are reflected in active learner engagement, teachers' pedagogical repertoires and the harnessing of learners' epistemological diversity as a productive learning resource. The mixing of the two pedagogical frameworks catered for both individual and social learning with the latter being reflected in the externalisation of one's thinking (Cope & Kalantzis (2015). Consequently, the pedagogical strategies that produced rich learning experiences are the ones which reflected the characteristics mentioned above. They highlight the many ways in which teachers in the various classrooms moved backwards and forwards between knowledge processes and modes of interaction to 'get the mix right'.

First, high teacher-student interaction with the knowledge processes of conceptualising and experiencing were observed in some lessons. Although the teacher's role was explicit, she drew on learners' prior knowledge, lived experiences, interests and local context, to scaffold learning within the ZPD. Examples of experiencing also included the use of multimodal content like YouTube videos to enhance the learning. Active learner participation was also a feature of this pedagogical mix as learners become active concept makers. However, medium teacher-student interaction with the knowledge process of conceptualising and without co-opting learners'

experiences to develop concepts and make meaning, indicate a teacher-centric approach. Although learners may participate in the lessons, the initiation-response-evaluation sequence which is indicative of didactic pedagogy (Cazden, 2001, in Cope and Kalantzis, 2015), was prevalent.

Medium or high teacher-student interaction followed by medium to low student-content interaction generally represent the knowledge processes of conceptualising and/or experiencing and analysing and/or applying. In this instance after making sense of new concepts, learners work to analyse and apply knowledge appropriately or creatively to tasks. The focus in this case is usually on individual learning. The meaning making process is enriched if the teacher draws on learners' prior knowledge, lived experiences and their interests.

Medium to low teacher-student interaction combined with student-content and teacher-student-content interaction at medium levels were generally observed during the watching of videos. This also involves the knowledge processes of conceptualising, experiencing and analysing where in the watching of the video the teacher would pause to explain a concept which then would lead to a discussion and analysis of the content. In some classrooms, there was a seamless weaving backward and forward between modes of interaction and knowledge processes with the teachers' role shifting between an explicit teaching role to that of a facilitator. In other classrooms, this was a linear process starting with teacher-student interaction, followed by student-content interaction with the passive watching of the video and then, teacher-student-content interaction in which the content of the video was used in a debate.

Medium teacher-student interaction combined with medium teacher-student-content interaction was also observed in the backward and forward weaving between conceptualising, experiencing and analysing. This pedagogical move was typical of some History lessons in which issues like xenophobia and propaganda were discussed. In these lessons, teachers facilitated the debates and learners' voices and agency were encouraged.

In fewer instances the four modes of interaction and knowledge processes were evident. This is represented by low teacher-student and low teacher-student-content interactions in which the teacher presented new information, co-opting learners' prior knowledge to assist with the

understanding of the new information. There was then joint meaning making and the teacher and learners analysed the information. Learners then worked individually (student-content) to apply the knowledge from the previous discussion to a task after which they discussed their findings with a partner (student-student interaction).

A neglected mode of interaction in most classrooms and which verified in the survey and interviews is student-student interaction. This mode of interaction contributes to active meaning making as learners work together harness their collective intelligence. Limited opportunities for student-student interaction, including with the use of digital technologies, rob learners of this collaborative opportunity to make meaning. This mode of interaction, which was sometimes reflected in group work, seems to suggest that teachers did not know how to plan meaningful collaborative activities with learners. However, high student-student interaction usually followed a brief period of teacher-student interaction in which the teacher would introduce the task and learners then collaborated to work on the assigned task, analyse and discuss. According to Van Haren (2010), this type of collaboration develops learner diversity as each learner has the opportunity to discuss and share ideas and develop their individual perspectives as well. Student-student interactions were then followed by teacher-student-content interaction in the subsequent lesson. Learners then had the opportunity to externalise their thinking as they, together with the teacher, discussed and analysed their findings. Such interactions reflected the application of higher-order thinking skills as articulated in the CAPS curriculum.

The process of analysing with the teacher requires them to be well prepared to use all available resources to develop their knowledge base and engage learners at a deep cognitive level. Failure to do so could result in superficial discussions, inaccuracies and missed pedagogical opportunities, as was evidenced in a few English lessons at Hampton High School.

This study found that teacher-student-content and student-student interactions that required critical analysis occurred less frequently in the high school classrooms observed. In some classrooms, the knowledge process of applying was limited to formative assessments where learners applied their knowledge appropriately to such tasks. Additionally, the knowledge process of applying creatively including with digital technologies, was observed in very few of the classrooms observed indicating that knowledge creation using multimodal sources was also rare.

Rich learning experiences are therefore reduced when there are less opportunities for learners to apply their knowledge creatively as well as engage in rich discussions that develop analytic skills.

Anderson's (2003) theorem, which was particularly formulated for distance education suggests that deep and meaningful learning could occur if one mode of interaction occurs at a high level and the others at a minimal level. This first thesis suggests that the intensity of the engagement would lead to better learning outcomes. The second thesis which posits that high levels of more than one mode of interaction could occur without devaluing the educational experience, speaks to the quantity of time spent on a task. By applying Anderson's suggestion of time spent on interaction in the analysis, this study did not find any instance of more than one mode of interaction at a high level in a single lesson, as suggested in the second thesis. Instead, the study found that the use of multiple modes of interaction at a medium level did not devalue the learning experience.

Additionally, there were periods of low student-student interaction in the History lesson at one of the colleges when learners were required to work in groups to conduct brief internet research on 'equality'. Although the period of interaction was brief, learners were actively involved in the task and extended the discussion to the issue of equity. This suggests that meaningful learning could also occur in a very short period and when interaction is seemingly low. Therefore, the value of an interaction, especially in face-to-face settings, could also be measured in terms of the blend of knowledge processes and the quality of the engagement rather than the time spent on the interaction.

The next section examines ways in which the harnessing of learners' epistemological diversity contributed to rich learning experiences.

8.3.2 How is the epistemological diversity of learners being privileged through teachers' pedagogical choices?

As part of the investigation of teachers' pedagogical strategies, this study also examined ways in which teachers harnessed learners' epistemological diversity, which means that activities are

grounded on learners lived experiences and their interests and learners' participative agency and voices are valued (Janks, 2013; Kalantzis & Cope, 2010; Pahl & Roswell, 2005).

This study found that co-opting of learners' diversity contributed to rich learning experiences. The issue of reflecting learner diversity and their multiple ways of making meaning and being in the world reflect the need for classrooms to be authentic and inclusive. It requires teachers to know their learners and to engage with them to learn what they value. The diversity of sources and texts on the internet and the accessibility of digital technologies provide an opportunity for teachers to enrich their lessons by using multiple sources of knowledge, even if a text is familiar. They also need to find a way to use the familiar to make sense of the unfamiliar. Cope and Kalantzis (2015) explained that the process of experiencing involves learners reflecting on what is known by being immersed in new experiences, which can involve the use of virtual texts, images and data. One example of this was seen in the study of Shakespeare's *Twelfth Night*. Prior to reading the text, the teacher gave learners the task of conducting internet research to compare the role of women in Elizabethan society to the role of women in contemporary society. In their research and subsequent discussion, learners drew on their lived experiences as South African young women, referring to the issue of femicide that was topical at the time given the murder of several young women, to engage with the Shakespearean text. In this instance, the context played a very important role in framing the discussions.

On the other hand, during the visual analysis of two American film posters in another school, discussions were superficial as there were no attempts to use the affordances of the internet to search for information about the movies to have a richer discussion and relate the issues to the lives of the learners. Perhaps, instead of relying on the visual texts in the textbook, the teacher could have used more familiar South African films for that aspect of film study.

Learners' participative agency was valued in the classrooms that allowed them the freedom to voice their views and engage in discussions, the freedom to determine if they wanted to work in a group or individually, and the liberty to choose their poems from a variety of genres. One example where learners' voices were valued and encouraged was in the discussion about conscription in History lesson. While discussing conscription in World War I, the teacher asked learners to share their views on the possibility of conscription being implemented in South Africa

and if this would get people off the streets. A link was made with the requirement for young doctors to do some form of community service. This became a very emotive issue that was clearly divided along racial lines: One learner objected to doctors having to go to a township area to do community service, and another learner replied, *“What’s wrong with going into a township area?”*. The teacher allowed learners to have the debate, which in some instances mirrored discussions happening in the wider society. She followed up by asking, *“Don’t you think it is altruistic that people would volunteer?”* One learner disagreed and stated that you learnt more valuable skills in the army. Although this is probably an unusual classroom discussion, it demonstrates the level of agency permitted in that teacher’s classroom. On the contrary, she exhibited tight control as regards the use of smartphones in the classroom and the level of digital technologies used.

The issue of learner agency can also be linked to specific school contexts. For instance, in one High School, there was clearly tight teacher control, which can be linked to the principal’s comment *“We want teachers to control lessons and control the content but in a way that allows the child to learn”*. This teacher-centric view is in contrast to Van Haren’s (2010) comment that learner diversity is developed when they have opportunities to share their individual perspectives. Richer learning experiences are produced when learners are able to participate fully in discussions and their agency is valued.

The harnessing of learners’ epistemological diversity could equally be viewed in the use of multimodal texts that connect to their lifeworlds and the opportunities for them to present their learning using different modes (Van Haren, 2010). This provides learners with choice and is linked to their technological lifeworlds. This was observed mainly in one English classroom as part of the teacher’s pedagogical strategy as she intentionally included multimodal texts in her lessons and provided opportunities for learners to present their work in different modes. However, the largely representative use of digital technologies in the other classroom with few opportunities for learners to create knowledge in multimodal ways, is an impediment to the creation of rich learning experiences. Moreover, the lack of digital access for most learners in government schools, makes it difficult for teachers to create tasks that would require them to present work in multimodal ways particularly using digital technologies.

In conclusion, the issue of harnessing learners' epistemological diversity requires teachers to plan lessons that speak to learners' interests and lived experiences. However, understanding what is of interest to learners is a complex issue in diverse classrooms since what a teacher perceives to be of interest to some learners may exclude others. This raises the question of what happens when the teacher's choice of text or mode does not resonate with all learners. How does a teacher appeal to a diverse group of learners from different backgrounds? It is evident that the issue of harnessing learning diversity can be quite complex as teachers need to be skilled to engage in sensitive issues, like the discussion in Alice's classroom. These are questions that require further investigations as this remains a complex issue.

8.4 CHARACTERISTICS OF THE 21ST CENTURY SECONDARY SCHOOL LEARNING ENVIRONMENT

The main research question for this study was,

- What are the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences?

The characteristics proposed in the following subsections are based on the findings from this study and the literature around which it is framed. They emphasise the importance of authentic learning experiences and the active participation of the learner. They also recognise the complexity of the role of the teacher who provides opportunities for collaborative and individual learning.

8.4.1 Multimodality

Regardless of contexts, learners make meaning in multimodal ways as they engage in multimodal environments and interact with different forms of media and texts. This suggests that their engagement with texts blend speech, written texts, visual and audiovisual images, audio files and gestures (Pahl & Rowsell, 2005). In the South African context, there is increasing access to mobile technologies. Teachers therefore need to incorporate these multiple sources of meaning-making into the classroom to infuse their lessons with multiple texts instead of relying on a prescribed

textbook or handout. Learners' tasks should shift from being monomodal, that is print based, to multimodal.

Multimodality also suggests the use of digital technologies to enhance the learning experience since such technologies are critical to the 21st century learning environment. There must be an effective blend of representative and generative uses of technologies with the ultimate goal to provide greater opportunities for learners to generate knowledge and use them creatively. Transformative technology use will therefore reflect greater opportunities for learners to learn with digital technologies with fewer opportunities for their representative use. It is therefore not a question of one or the other but how opportunities for both types of use are created as teachers move up and down the continuum, depending on the nature and intended outcome of the activity and the affordance capabilities of the available technologies

8.4.2 Diversity

The concept of diversity in the classroom speaks to differences and extends beyond gross demographics to include learners' various semiotic resources. Learners' cultures, identities and their multimodal knowledge sources also count as legitimate knowledge sources. Conole and Dyke (2004) list diversity as an important ICT affordance. South African classrooms therefore need to reflect the rich diversity learners bring to the learning environment and in this way avoid 'assimilationism' (Carrim, 2013) as a way to provide authentic, rich learning experiences. An important goal of the CAPS curriculum and one of the benefits of the e-education policy is promoting equity in the classrooms. Valuing learner diversity as an important classroom resource is an important means of achieving equity.

More specifically, harnessing learners' epistemological diversity which speaks to their diverse knowledge resources like their lived experiences, background knowledges and multimodal ways of making meaning, not only helps to achieve equity but also create an authentic learning environment. Van Haren (2010) explained that learner diversity is enhanced when learners are given opportunities to think, discuss, share ideas as well as develop their individual perspectives while contributing within a collaborative space.

Participative agency is critical to the harnessing of epistemological diversity. It speaks to the valuing of learner agency where the classroom is an inclusive space that privileges learners' voices and their diverse perspectives.

Freedom of choice which was observed in some classrooms is also a key facet of diversity. Access to a diversity of texts and multimodal knowledge sources from which to choose helps to create a learning environment that is authentic and recognises diversity. Freedom to choose the composition of groups was also observed in some classrooms. Freedom of choice is closely linked with teacher flexibility and reflects a learning environment that is not teacher-centric.

8.4.3 Pedagogical Repertoire

Kalantzis (in Education at Illinois, 2019b) stated that "if we are correct about the types of learners coming into our classroom, there is not going to be a one-size-fits-all pedagogy". Consequently, teachers in the 21st century need a pedagogical repertoire that provides learners with diverse opportunities for individual and collaborative learning. Cope and Kalantzis' (2015) knowledge processes of experiencing, conceptualising, analysing and applying as well as the following modes of interaction (teacher-student; teacher-student-content; student-student and student-content) should comprise a teacher's repertoire. Transformative pedagogical strategies used in some classrooms in this study indicated a backward and forward movement between modes of interactions and knowledge processes where the teacher provided opportunities for individual and collaborative learning.

This dialogical backward and forward movement would see the teacher's role shift between an explicit teaching role where the teacher scaffolds the learning in the conceptualisation process to that of a facilitator as the teacher and learner jointly construct meaning and with a focus on analysis.

8.5 CHAPTER SUMMARY

This chapter presented the findings of the study and answered the two research sub-questions. This information was used to answer the main research question and to provide the characteristics of the 21st century learning environment. These characteristics indicate that rich

learning experiences in the contemporary classroom are created in a multimodal learning environment that reflects diversity and a blend of pedagogical strategies and allows for the greater participative agency of learners. The role of the teacher is not fixed but is dynamic depending on the task and the pedagogical strategy used. The next chapter presents the conclusions and recommendations of the study as well as reflections on the learning process.

CHAPTER 9: CONCLUSIONS

9.1 CONTRIBUTION OF STUDY

The previous chapter discussed the findings of this study as they relate to the two sub-questions dealing with the appropriation of digital technologies and teachers' pedagogical strategies. It also answered the main research question by outlining the features of the contemporary learning environment. In keeping with the purpose of the study as stated in section 1.4 and consequently its main contribution, I designed a model of the 21st century learning environment and present it in this chapter. This model builds on the insights from the findings from this study and draws particularly on best practices regarding teachers' pedagogical approaches and their use of digital technologies. Since the teachers in this study rarely used digital technologies in transformative ways, perspectives on the appropriation of digital technologies that were cited in the literature will also guide this model. I hope that it will serve as a guide for educators and policy makers to "move education beyond the brink of being transformed" (Laurillard, 2008) to actually being transformed.

Another contribution of the study is its unique examination of teachers' pedagogical strategies, including exploring the way they harness learners' lived experiences the classroom. Two different frameworks were used to understand teachers' pedagogical practices. This pedagogical mix has created a unique pedagogical repertoire that could be used by teachers to transform their pedagogical practices.

This study also extended Anderson's (2003a) interaction equivalency theorem by adding another mode of interaction, thereby increasing its suitability for face-to-face learning contexts. Teacher-student-content was added to differentiate between activities characterised by explicit teacher input when teaching new concepts and presenting new information and those involving active learner participation where the teacher and learners work together to analyse and make sense of different texts.

9.1.1 Model of the 21st Century Learning Environment

The aim of this flexible conceptual model is the creation of rich learning experiences in the 21st century learning environment and to contribute to the transformation of teachers' pedagogical practices. It reflects the view that learning is a social and situated process that requires active learner participation. As such, it breaks from the traditional, teacher-centric approaches for which many classrooms have been criticised. A crucial aspect of this model is harnessing learner diversity, in particular, their diverse knowledge sources which helps to address the issue of equity in the classroom. This model also emphasises the importance of authentic learning experiences.

The model and draws on the extension of Anderson's (2003a,) interaction equivalency theorem which was used in this study and the knowledge processes of Cope and Kalantzis' (2015) Learning by Design pedagogy to create a pedagogical mix of approaches aimed at transforming teachers' practices. It also draws on the evidence of best practice in this study that were used to frame the characteristics of the 21st century learning environment as articulated in 8.4 in the previous chapter. The model allows for the incremental use of digital technologies as learners' and teachers' in-school and out-of-school access to such technologies increase. It caters for teachers and learners in both technology-rich and technology-constrained environments as follows:

- **Technology-rich environments:** Technology-rich schools are those whose learners have ubiquitous access to digital technologies in-school and out-of-school. Teachers' practices represent greater generative use of digital technologies (GEN), which means there is more examples of learning *with* technology and less opportunities for their representative use (rep), that is learning *from* technology, (GEN+rep). As such, their practice demonstrates more transformative use of digital technologies, thereby harnessing a plethora of digital affordances. Some learning activities are conducted synchronously and asynchronously using available learning platforms. Face-to-face interactions involve active meaning-making between the teacher and learners as well as between learners themselves.
- **Technology-constrained environments:** Technology-constrained environments are those in which teachers have access to digital technologies in school but may not have internet connectivity outside of school. Learners in these environments may have limited or no

access to digital technologies outside of school except for a basic smartphone, and hence, their main source of access is the school environment. As such, schools need to ensure that access is available to all learners instead of for the exclusive use of those who are doing CAT, IT and Engineering Graphic Design as they may be the privileged few who have digital access outside of school. As such, the appropriation of digital technologies in these schools is evidenced by greater representative use (REP), that is more opportunities to learn *from* technology, and less generative use (gen) (REP+gen). Although the focus of technology use may be representative, teachers need to use the information and knowledge gained to generate rich discussions and debate and in this way facilitate active meaning-making.

A gradual reduction in teacher-student interaction is encouraged in both environments as learners take greater responsibility for their learning. Activities that require high teacher-student interaction can be replaced by student-student and/or student-content interactions, particularly using digital technologies as learners engage in the process of conceptualising. Face-to-face class time is then used for richer discussions and for deep analysis of content. Learners with minimal out-of-school digital access can use desktop computers in a computer laboratory or resource centre for this purpose or specially curated content that they download onto their phones during school time for use outside of school.

An important aspect of the model is teacher learning; hence, it includes Anderson's (2002, 2004) teacher-teacher and teacher-content modes of interaction. In this way teachers are able to improve their self-efficacy and change negative beliefs about the integration of digital technologies, thereby providing them with the tools to transform their learning practices.

Figure 9.1 presents the conceptual model of a 21st century secondary school learning environment and shows the patterns of interaction between the teacher, learners and content with the accompanying knowledge processes and modes of instruction, which allow for face-to-face or blended. Table 9.1 is an explanation of the model.

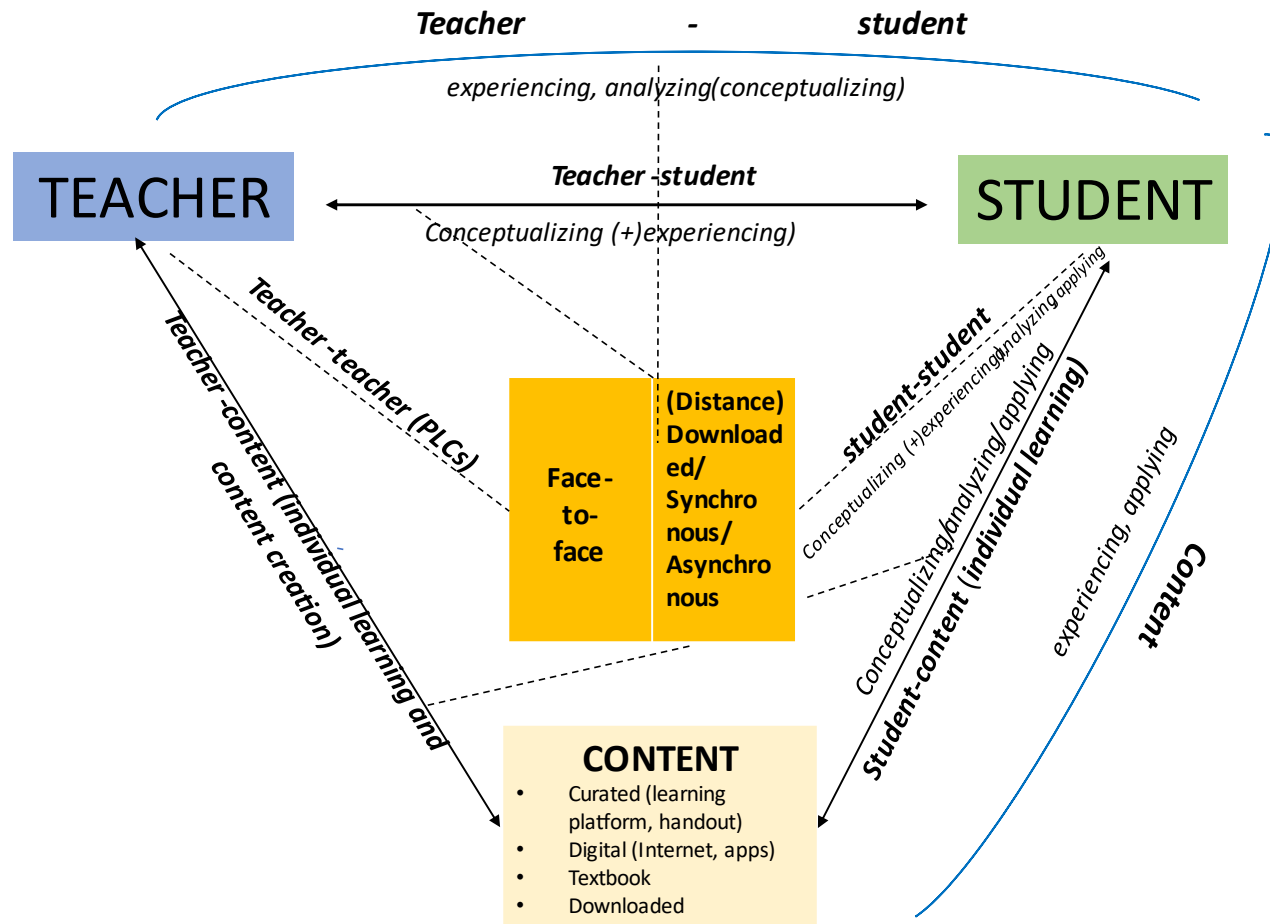


Figure 9.1: Conceptual model of a 21st century South African secondary school learning environment

Table 9.1: Explanation of learning model

Mode of interaction and knowledge process	Explanation	Mode of communication	Content
Teacher-student (T-S) interaction + conceptualising and/or experiencing	The role of the teacher is that of an instructor who presents concepts and information and leads the knowledge process of conceptualising. High interaction involves active learner participation in the process. Rich learning experiences occur when the teacher draws on examples from learners' lived experiences and their local knowledge to enrich learning, thus including the knowledge process of experiencing. Note: T-S with conceptualising should be kept to a minimal.	Occurs either face-to-face or synchronously using a video-conferencing platform.	Curated by teacher (available in handout or on a learning platform). Textbook (minimal use).
Student-student (S-S) interaction + conceptualising, analysing, applying and/or experiencing	This can replace or minimise teacher-student interaction in some cases as learners work together to understand new concepts, thus reducing the teacher's role. It indicates collaboration between learners as they analyse a text or apply knowledge learnt to create new knowledge. The teacher facilitates the interaction and provides guidance when needed.	This occurs face-to-face or synchronously using video conferencing or a social platform or asynchronously.	Curated (handout, learning platform). Online (internet). Learners also create content.
Student-content (S-C) interaction + conceptualising, analysing, applying	This allows for individual learning where the learner uses the knowledge process of conceptualising to understand new concepts, again minimising teacher-student interaction. The teacher should provide guided activities to assist with conceptualisation. S-C also indicate assessments that require learners to use the knowledge processes of analysing and applying.	This can be for out-of-classroom asynchronous learning at home or in school resource centre/IT lab if learners do not have digital access at home. Learners can work synchronously using an educational app.	Curated. Learning platform. Podcasts or online videos, perhaps, uploaded onto platform for easy monitoring. Learners can download content at school for use offline at home.
Teacher-student-content (T-S-C) interaction + analysing,	Teachers and learners analyse and apply knowledge gained in the process of conceptualising reflected in low or medium T-S. The process of experiencing is used to enrich the learning.	This is mainly done face-to-face.	Curated content.

Mode of interaction and knowledge process	Explanation	Mode of communication	Content
applying, experiencing, conceptualising	T-S-C involves rich discussions and debates. The teacher's role is that of a facilitator.		Content from S-C activities (could be in digital format or on paper). Online content.
Teacher-content (T-C) interaction	Continuous teacher professional development through individual teacher learning. Teacher's own initiative Structured as part of school's professional development programme. Involves teacher creativity. Creating multimodal content.	Asynchronous/downloaded content (offline). Multimodal.	Online sources. Curated resources.
Teacher-teacher interaction (PLC)	Continuous teacher development through PLCs. Collaborative (smaller groups). Teachers collaborate as designers to create content. Large group one-size-fits-all teacher learning should be kept to a minimum.	Synchronous using video conferencing and face-to-face.	Online. Learning platform. Downloaded. Curated. Handouts.

9.2 RECOMMENDATIONS

The following recommendations are based on observations and findings from the study:

- **Continuous learning for school leadership:** Flanagan and Jacobsen (2003) and Hew and Brush (2007) highlighted the importance of school leadership leading technological integration in schools. They suggested that if a principal is not familiar with the affordances of digital technologies and are not prepared for their role as technology leaders, teachers will not be motivated to integrate it into their practices. For example, one of the principals and deputy principals reduced the purpose of digital technologies to being *“a provider of information”* and the other stated that *“it is a good repository of material (and) a good research tool”*. Although numerous studies have examined teachers’ perceptions and beliefs as barriers to integration in the local context, there is a paucity of research investigating the beliefs and perceptions of school leaders and how they may hinder the changed being envisaged in policy. This study has observed that there are leaders with traditional beliefs about teaching and learning, particularly regarding digital technologies. Continuous learning for principals is therefore vital to amend their beliefs and provide them with the skills necessary to transform teaching and learning.
- **Shared pedagogical vision:** Shared pedagogical vision between teachers and school leaders is also important. This was also highlighted by Flanagan and Jacobsen (2003) as an impediment to technology integration.
- **Situated professional development and continuous teacher learning:** The Department of Education (2007, p.4) guidelines for professional teacher development in ICT clearly state that *“teacher development programmes should provide teachers with contextualised learning experiences and be subject-specific and relevant to their learning areas”*. In addition, the PLCs guidelines emphasise the need for continuous teacher development, and hence, support teacher-teacher interaction (Anderson, 2003a, 2003b, 2004). This is a crucial way of moving beyond *“over-simplified approaches that treat technology as an ‘add-on’”* (Koehler et al., 2013, p. 16). The learning of technical skills must be contextualised (Jonassen, 1996). The focus should be how to actualise digital

technology skills in the classroom, and more importantly, on how to create opportunities to generate knowledge by ensuring teachers are aware of the many affordances of the technologies being provided. This will help improve their self-efficacy and their technology self-efficacy.

- **Cost-effective technological solutions:** In an environment with continuous financial constraints, it may not be feasible to invest in expensive IWBs for a few schools while others are neglected. A solution that may see the interactive capabilities reaching many more schools could be to invest in another form of interactive classroom technology like the MimioTeach IWB system like Queenstown College did.

9.3 RECOMMENDATIONS FOR FUTURE RESEARCH

Deeper investigation into the ways in which the current CAPS curriculum may be constraining or preventing transformative pedagogical approaches in classrooms is urgently needed. The comment by the principal of one of the schools that they are hamstrung by what the DoE wants them to do since the current curriculum is ‘extensive’ is evidence of the possible constraints placed on schools. The tightly restricted content of the CAPS curriculum was also highlighted by Tarling and Ng’ambi (2016) in a previous study. This could perhaps explain why teachers using the curriculum seemed preoccupied with covering content for formative and summative assessments and for the frequent learner question “is this coming in the test?”

9.4 LIMITATIONS OF THE STUDY

The length of time (3–4 weeks) spent in classroom observations as well as the term in which data were collected could influence practices, and consequently, the data collected. Firstly, given the brief length of time spent at each school, some completed assessments were not observed. A longer period of observations may have revealed slightly different results.

Regarding the quantitative aspect of the study, there were weaknesses in the survey design. Firstly, the survey questions could have been more closely aligned with interview questions. Secondly, questions regarding the purposes for which teachers use digital technologies could have been more specific to provide a better understanding of teachers’ technological

appropriation. Since learners did not actively participate in the study, survey questions about the use of digital technologies should have included questions that required teachers to be more specific about the types of activities for which learners use digital technologies in their classrooms. This would have provided richer data, which would have provided greater quantitative evidence of teachers' representative and generative uses of digital technologies.

Another weakness in the study was that it did not assess student learning and focused only on teachers' practices. The assessment of student learning would have strengthened the study and provided evidence of the effectiveness or ineffectiveness of teachers' classroom practices.

9.5 REFLECTIONS ON THE USE OF DIGITAL TECHNOLOGIES

One of the biggest surprises of the PhD process relates to the appropriation of digital technologies in technology-rich schools with ubiquitous access to a range of technologies, with learners who are privileged to have digital access and teachers who also have immense digital access including to continual training opportunities. Prior to the commencement of observations, there was the expectation that teachers would be using technologies in transformative ways and I was looking forward to observing innovative technology use in classrooms. Instead, although digital technologies were used often, they were primarily being used to transmit information. Tablets and laptops were mainly textbook replacements, being used to access, retrieve and share resources; learning platforms were used to store curated resources, interactive white boards were used like regular white boards and opportunities for learners to create content were rare. In addition, assignments were generally written and submitted on paper and in some cases, learners were told to write and submit work in the traditional way. I found this very puzzling as this occurred across most classrooms, even with teachers who had very positive beliefs about the use to technology for teaching and learning.

In the intervening period between data collection and the completion of this thesis, teaching and learning was interrupted by the COVID-19 pandemic and there was the shift to emergency remote teaching and learning, ERTL. Anecdotal evidence indicates that these schools were able to immediately shift their teaching and learning online and adapt given the availability of the various platforms and the training received. The question is, given digital access and apparent

digital fluency in these schools, why were digital technologies still being used as transmission devices? It is hoped that with the end of ERTL, teachers and learners have begun to harness the affordances of the various technologies and are now using them in transformative ways in their daily practice.

Another observation was the glaring digital divide between learners in technology-rich schools and those in government schools. Yet, the government schools had computers in labs and in their resource centers and one, in particular, had ubiquitous Wi-Fi for teachers and learners while the other could not afford Wi-Fi for all learners. Opportunities for learners to learn about computers were rarely provided with such opportunities being limited to learners taking CAT and IT from Grade 10. Additionally, computer literacy lessons did not appear to be a priority in such schools as there was a growing interest in robotics and coding, the new technology trends in many schools. In my interview with one of the high school teachers she stated, “there’s lots of kids that grow up not having access to tablets, computers and don’t know how to use them”. She added that “when we’re doing projects and they have to type it up. The kids don’t know how to do the layout cause there’s no computer lessons for kids”. She confirmed that coding is offered to children in lower grades, yet they do not know how to use word or PowerPoint. The IT strategy of these high schools and perhaps other public schools including the Department of Education raises a number of questions: Should the focus be on coding and robotics while ignoring the provision of basic computer literacy skills for learners? How can the majority of learners be future-ready if computer literacy skills are de-emphasised? Should limited resources be concentrated only on a select few while the computer literacy needs of those who lack digital access are ignored? Are we then ignoring the basic goal of the e-education policy “that learners will be ICT capable” and “be able to use ICTs confidently and creatively?” It is my hope that studies such as this one would help to emphasise the need for schools and education department to rethink the rethink their ICT strategies.

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APPENDICES

Appendix A: Ethics Clearance Letters

Appendix A1: Wits School of Education

Wits School of Education

UNIVERSITY OF THE
WITWATERSRAND,
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12 July 2018

Student Number: 0414073w

Protocol Number: 2018ECE011D

Dear Jeanette Andrea La Fleur

Application for Ethics Clearance: Doctor of Philosophy

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate, has considered your application for ethics clearance for your proposal entitled:

Investigating the characteristics of the 21st century South African secondary school learning environment that produce rich learning experiences

The committee recently met and I am pleased to inform you that **clearance was granted**. Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M Mabete'.

Wits School of Education
011 717-3416

cc Supervisor – Dr Reuben Dlamini

Appendix A2: Gauteng Department of Education Research Approval



GAUTENG PROVINCE

Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	26 July 2018
Validity of Research Approval:	05 February 2018 – 28 September 2018 2018/205
Name of Researcher:	La Fleur J.A
Address of Researcher:	PO Box 862
	Kelvin
	Johannesburg, 2054
Telephone Number:	011 802 3081 082 523 7285
Email address:	0414073w@students.wits.ac.za
Research Topic:	An investigation of the characteristics of the 21 st century South African Secondary School learning environment that produce deep and meaningful learning
Type of qualification	PhD
Number and type of schools:	Two Secondary Schools.
District/s/HO	Johannesburg North.

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

[Signature] 27/07/2018

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management

7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488

Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

1. The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.
2. The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.
3. A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.
4. A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.
5. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.
6. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.
7. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.
8. Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
9. It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.
10. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.
11. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.
12. On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.
13. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.
14. Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards



Mr Gumani Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: 27/07/2018

Appendix B: Consent and Assent letters

Appendix B1: Principal consent letter

Dear ...

Re: Permission to conduct research – Ethics Protocol Number 2018ECE011D

My name is Jeanette La Fleur and I am currently reading for a PhD in the School of Education at the University of the Witwatersrand.

I am conducting research on the contemporary South African secondary school classroom and will be investigating the characteristics of the 21st century classroom that would provide deep and meaningful learning for students. Thus, the title of my research is '*An investigation of the characteristics of the 21st century South African secondary school learning environment that produce deep and meaningful learning*'. My interest in this research has been sparked by the recent narrative about the Fourth Industrial Revolution and the widespread use of digital technologies in schools which is undoubtedly changing the classroom ecosystem. Consequently, there is an increasing demand for learners to have 21st century skills which would prepare them for the new world of work, an issue that is quite relevant to South Africa which has high youth unemployment and a very high secondary school drop-out rate.

One of the objectives of this study is therefore “to identify ways in which digital technologies have been appropriated within the classroom and how they are influencing teaching and learning”.

This study is significant because it will provide a model of a contemporary South African classroom that acknowledges learners' identities and diversity as well as extend the body of knowledge on the use of digital technology in the contemporary classroom. The study will also break new ground on the empirical investigation of such use, in order to justify investment in this mode of teaching and learning.

I am inviting your institution to participate in this study because of its use of digital technologies in the classroom. The results of the study may be valuable to your institution and also to the education sector as a whole.

I would especially like to conduct research in two separate Grade 9 classrooms, preferably English and History. I plan to spend a maximum of 5 weeks in each classroom. Data collection for my research will involve classroom observations and semi-structured interviews with the principal, the two subject teachers and possibly the person responsible for technology at your school. These interviews will be recorded to ensure accuracy of data collected and thus I am seeking permission to audiotape them. They will last maximum 45 mins. I will also be conducting a questionnaire survey and am inviting all teachers to participate. Samples of learners' work will also be collected along with samples of teachers' lesson plans where necessary.

All names and the identities of participants will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study. All research data will be destroyed between 3–5 years after completion of the project.

I would like to assure you that you will not be advantaged or disadvantaged in any way through your participation and since this is voluntary, you may withdraw your permission at any time during this project without any penalty. There are no foreseeable risks in participating and you will not be paid for this study.

Should you grant permission, information letters and consent forms will be sent to teachers, parents and learners.

Please feel free to contact me should you require additional information.

Looking forward to receiving a positive response.

Yours sincerely

.....

Jeanette La Fleur

Email: 0414073w@students.wits.ac.za

Appendix B2: Teacher consent letter and Form

Dear ...

My name is Jeanette La Fleur and I am a PhD student in the School of Education at the University of the Witwatersrand.

I am doing research on the contemporary South African secondary school classroom and will be investigating the characteristics of the 21st century classroom that would provide deep and meaningful learning for students. I will be observing classroom activities and in particular, the types of interactions that take place i.e. teacher-student; student-student; student-content and; teacher-student-content as well as recording the use of digital technology in the classroom.

Data collection for my research will involve classroom observations which will last four to six weeks and a semi-structured interview with you before commencing observations. This interview will last approximately 60 mins and will also be recorded to ensure accuracy of data collected and I would also like to have copies of your lesson plans and a few samples of learners' work. I will be conducting a brief questionnaire survey as well.

The reason why I have chosen your school is because of the diverse learner population as well as your use of digital technology in the classroom. I would be grateful if you could consent to participating in this important study which is hoped would provide better insight into the 21st century classroom and more importantly, create a model of the contemporary classroom.

Your name and identity will be kept confidential at all times and in all academic writing about the study. Your individual privacy will be maintained in all published and written data resulting from the study. All research data will be destroyed between 3–5 years after completion of the project.

I would like to assure you that you will not be advantaged or disadvantaged in any way. Since your participation is voluntary, you can withdraw your permission at any time during this project

without any penalty. There are no foreseeable risks in participating and you will not be paid for this study.

Kindly complete the attached consent form.

Please let me know if you require any further information.

Yours sincerely,

.....

Jeanette La Fleur

Email: 0414073w@students.wits.ac.za

Please fill in and return the reply slip below indicating your willingness to be a participant in my voluntary research project called:

I, _____ give my consent for the following:

Permission to review/collect documents/artifacts Circle one

I agree that lesson plans/assignments can be used for this study only.

YES/NO

Permission to observe you in class

I agree to be observed in class.

YES/NO

Permission to be interviewed

I would like to be interviewed for this study. YES/NO

I know that I can stop the interview at any time and don't have to
answer all the questions asked. YES/NO

Permission to be audiotaped

I agree to be audiotaped during the interview YES/NO

I know that the audiotapes will be used for this project only YES/NO

Permission for survey questionnaire

I agree to complete a questionnaire YES/NO

Informed Consent

I understand that:

- My name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotaped.
- All the data collected during this study will be destroyed within 3–5 years after completion of my project.

Sign:.....Date.....

Appendix B3: Parent information letter and consent form

1 August 2019

Dear ...

My name is Jeanette La Fleur and I am a PhD candidate in the School of Education at the University of the Witwatersrand and I'm currently conducting research on the contemporary secondary school classroom.

Our children are exposed to computers, different applications and other forms of digital technology in the classroom which are influencing the way teachers teach and the way children learn. Hence, the traditional classroom as we know it, is slowly changing. I am investigating the nature of these changes as well as the kinds of interaction that take place in the classroom, with the aim of identifying the features of the 21st century classroom which would help to provide rich learning experiences for our children.

Data collection for my research involves teacher interviews, a questionnaire survey as well as non-participant classroom observations. I would therefore be observing your child's History and English lessons for approximately four weeks. I will be as unobtrusive as possible during observations.

I am inviting your child to participate in this study and would like your permission. Your child will not be advantaged nor disadvantaged in any way. She will be reassured that she can withdraw at any time during this project without any penalty. There are no foreseeable risks to participating and your child will not be paid for this study. In addition:

- Your child's name and identity will be kept confidential at all times and in all academic writing about the study and the name of the school will not be revealed.
- Her individual privacy will be maintained in all published and written data resulting from the study.

Further, data collected during this study will be destroyed within 3–5 years after completion of my project.

Kindly follow the link in this email, complete the attached form and return to me as soon as possible. If you require any further information, please feel free to contact me.

Yours sincerely,

Jeanette La Fleur

Email: 0414073w@students.wits.ac.za

Cell: 0825237285

Parent Consent Form

Please fill in and return the reply slip below indicating your willingness to allow your child to participate in the research project called :

I, _____ the parent of _____

Permission to review/collect documents/artifacts

I agree that my child's assignments can be used for this study only.

Circle one

YES/NO

Permission to observe my child in class

I agree that my child may be observed in class.

YES/NO

Informed Consent

I understand that:

- my child's name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.
- he/she does not have to answer every question and can withdraw from the study at any time.
- he/she can ask not to be audiotaped, photographed and/or videotape
- all the data collected during this study will be destroyed within 3-5 years after completion of my project.

Sign _____ Date _____

Appendix B4: Learner assent form

Please fill in the reply slip below if you agree to participate in my study:

My name is: _____

Circle one

Permission to observe you in class

I agree to be observed in class. YES/NO

Permission to review/collect documents/artifacts

I agree that samples of my assignments and class work
can be used for this study only. YES/NO

Informed Consent

I understand that:

- my name and information will be kept confidential and safe and that my name and the name of my school will not be revealed.

- I do not have to answer every question and can withdraw from the study at any time.
- I can ask not to be audiotaped, photographed and/or videotaped.
- all the data collected during this study will be destroyed within 3–5 years after completion of my project.

Sign _____ Date _____

Appendix C: Interview Schedule

Appendix C1: Individual teacher questions

1. For how long have you been teaching at this school?
2. Do you have access to multiple forms of digital technologies in your school? Do you have reliable internet connection?
3. What kind of training have you had in the use of digital technologies in the classroom? Is this training ongoing?
4. In your view which forms of digital technologies provide the richest learning experiences for learners?
5. Do you think digital technologies enhance your work as a teacher or is it a hindrance?
6. How have digital technologies influenced the way children interact in the classroom?
7. Have you attended any workshops or training relating to education in the future i.e. skills needed for the 21st century? Give details.
8. Which of these do you think is/are most valuable?
9. How important is it to develop critical literacy among learners?
10. What opportunities are provided for learners to critically engage with texts i.e. to question, critique what is in the texts?
11. How important is collaboration and what opportunities are provided for learners to collaborate and interact in the classroom?
12. What opportunities are provided to learners to be creative and innovative?
13. How does learners' diversity influence your classroom activities?

Appendix C2: Interview questions for principals

1. How long have you been at this school?
2. What is the school's policy regarding the use of ICTs or digital technologies?
3. How important is the use of digital technologies in your school?
4. What kind of support is provided for teachers in the use of digital technologies?
5. What is your vision of the 21st century classroom? / What do you think the classroom of the future looks like?
6. What has informed these perceptions?
7. Would you consider your school as a 21st century learning institution? Why?
8. If not, what changes would you make to bring it into the 21st century?
9. What types of skills should schools be teaching in the 21st century?
10. How important is the development of critical thinking skills and what are some of the ways in which critical thinking is developed in your school?
11. How important is it for South African schools to recognise learners' diverse identities and cultures in the classrooms?
12. What opportunities are provided by your institution to value learners' diversity?

Appendix D: Observation Schedule

GRADE: SUBJECT:

DATE: TIME:

NUMBER OF STUDENTS: _____

SEATING: In groups In rows

DESCRIPTION OF CLASSROOM LAYOUT:

Resources	In room	Used	COMMENTS
Laptop			
Desktop computer			
Tablet/iPad			
Smartboard			
Data projector			
Mobile phone			
Internet access/Wi-Fi			
Non-digital			
White board			
Textbooks			
Exam pads			

Booklets			

LESSON PRESENTATION:

CLASSROOM INTERACTION	L	M	H	COMMENTS
Teacher-student				
Student-student				
Student-content				
Teacher-student- content				

Appendix E: Quantitative Survey Questions

SURVEY QUESTIONS

1. Kindly indicate your gender
☐ Male ☐ Female
2. How long have you been teaching?
☐ Less than 1 year
☐ 1-3 years
☐ 4-10 years
☐ 11-20
☐ More than 20 years
3. Did your pre-service training include training on how to use digital technologies?
☐ Yes ☐ No
4. Is ongoing training in the use of digital technology available for teachers in your school?
☐ Yes ☐ No
5. Have you attended any seminars/workshops on education in the 21st century or 21st century skills?
☐ Yes ☐ No

6. Which of the following technological tools or resources do you have access to in school? Tick ☒ where appropriate

Laptop	
Tablet/iPad	
Desktop computer	
Reliable internet connection (WiFi, 3G/4G)	
Smartphone or cell phone with internet access	
Interactive white boards/smartboards	
Computer labs	
Data projector	
Intranet	
Others (Please specify here)	

7. How often do you use these tools?

Kindly indicate with a Tick ☒	Never	Rarely	Sometimes	Often	All the time
Laptop					
Tablet/iPad					

Desktop computer					
Reliable internet connection (WiFi, 3G/4G)					
Smartphone or cell phone with internet access					
Interactive white boards/smartboards					
Computer labs					
Data projector					
Others (Please specify here)					

8. How frequently do you use digital technologies outside of school?

☐ Never ☐ Rarely ☐ Sometimes ☐ All the time

9. How often do you perform the following activities? Kindly indicate with a Tick ☒

	Never	Rarely	Sometimes	Often	All the time
Browse/search the internet for information and for resources to prepare lessons					
Use applications to prepare lessons					
Use apps to present lessons					
Create your own learning resources					
Post homework and assignments for students					
Use digital technology to provide feedback and /or access students' learning					
Communicate online or with an app with parents					
Download/upload/browse material from a learning platform					
Provide opportunities for blended learning					

10. How frequently do the following interactions occur in your classroom? Kindly indicate with a Tick ✓

	Never	Rarely	Sometimes	Often	All the time
Teacher-student interactions					
Student-student interactions					
Student-content interactions					
Teacher-student-content interactions					

11. Rank the following 21st century skills

21 st century skills	Very important	Important	Not important
Communication			
Critical thinking			
Collaboration			
Problem-solving			
Innovation			
Digital literacy			
Information literacy			

12. Which of these statements are true or false?

	True	False
The classroom should reflect what's happening in the real world		
Classroom resources and activities must reflect learners' diversity		
The classroom must reflect what's happening in the real world		
Digital technologies are changing I teach		
Digital technologies are changing the way students learn		

Appendix F: Language Editing Letter



WORDPLAY EDITING
Copy Editor and Proofreader
Email: karien.hurter@gmail.com
Tel: 071 104 9484
Website: <http://wordplayediting.net/>

25 June 2022

To Whom It May Concern:

This letter is to confirm that *Investigating the Characteristics of the Twenty-First Century Secondary School Learning Environment that Produces Deep and Meaningful Learning* by Jeanette Andrea La Fleur was edited by a professional language practitioner. It requires further work by the author in response to my suggested edits. I cannot be held responsible for what the author does from this point onward.

Regards,

A handwritten signature in black ink, appearing to be "K.H." with a stylized flourish.

Karien Hurter