

**PROPOSED THEORIES OF EDUCATION FOR EFFECTIVE
TEACHING AND LEARNING WHEN USING WEB2.0 TECHNOLOGY
IN DISTANCE EDUCATION**

by

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DEDICATION AND ACKNOWLEDGEMENTS

I dedicate this dissertation to my family, Mark, Daniel and Kate, thank you for your support and for sacrificing our time together in allowing me to complete this study. I also acknowledge and thank my mom who proves on a daily basis that the most effective tool used in teaching cannot be found in literature, but rather is demonstrated through the sharing of your passion with others.

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DECLARATION

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I declare that *Proposed theories of education for effective teaching and learning when using Web2.0 technology in distance education*, is my own work and that all the sources I used or quoted have been indicted and acknowledge by means of complete references.



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ABSTRACT

The research in this dissertation of limited scope aimed to identify theories of education for effective teaching and learning when using Web2.0 technology in distance education. The rationale for such a study is based on the premise that, globally, the dawn of the Fourth Industrial Revolution is bringing about a rapid technological growth and innovative information communication technology (ICT) tools which are utilised in distance education. The increase in connections across the globe has also seen an increase in online learning as the barriers of time and space have been bridged. These advances in technology have a direct impact on the education system which needs to experience a similar exponential development in the guiding theories for universities offering distance learning using Web2.0 technology. Qualitative research methods were used to conduct an integrative literature review of the most utilised pedagogical theories over time. The pedagogical principles were applied to the requirements for effective online teaching and learning to develop a guideline to determine which pedagogical principles and combinations are therefore applicable to 21st century distance education. The finding is that no one pedagogical theory researched in this study can be isolated to be applied to online learning, but rather that a combination – in varying degrees – will support an effective online teaching and learning environment. A document analysis was conducted to understand the current guidelines provided for e-learning in selected South African universities. This analysis indicated that there is much room for development to separate the traditional classroom policies from the online learning policies at higher education institutions. Summaries of applications and tools for effective online learning were presented, along with recommendations for developments within the field and for further research.

Key words: Distance education, e-learning, Information Communication Technology, Online learning, Pedagogy, Teaching, Learning Web2.0 technology

OPSOMMING

Die navorsing in hierdie verhandeling van beperkte omvang, is uitgevoer om opvoedkundeteorieë vir doeltreffende onderrig en leer wanneer Web2.0-tegnologie in afstandsonderrig gebruik word, te identifiseer. Die beweegrede vir sodanige studie is gebaseer op die uitgangspunt dat die aanbreek van die Vierde Nywerheidsomwenteling wêreldwyd aanleiding gee tot snelle tegnologievooruitgang en innoverende hulpmiddele vir inligtings- en kommunikasietegnologie (IKT) wat in afstandsonderrig gebruik word. Die toename in verbindings oor die wêreld heen het ook 'n toename in aanlynleer meegebring, aangesien hindernisse ten opsigte van tyd en ruimte oorbrug is. Hierdie vooruitgang in tegnologie het 'n direkte impak op die opvoedingstelsel, wat soortgelyke eksponensiële ontwikkeling in die rigtinggewende teorieë vir universiteite wat afstandslere deur middel van Web2.0-tegnologie aanbied, moet ervaar. Kwalitatiewe navorsingsmetodes is gebruik om 'n geïntegreerde literatuuroorsig uit te voer van die pedagogiese teorieë wat oor tyd die meeste gebruik is. Die pedagogiese beginsels is toegepas op die vereistes vir doeltreffende aanlynonderrig en -leer om 'n riglyn te ontwikkel ten einde te bepaal watter pedagogiese beginsels en kombinasies dus betrekking het op afstandsonderrig in die 21ste eeu. Die bevinding is dat geen pedagogiese teorie wat in hierdie studie ondersoek is, uitgesonder kan word vir toepassing op aanlynleer nie, maar eerder dat 'n kombinasie – in wisselende mate – 'n doeltreffende omgewing vir aanlynonderrig en -leer sal ondersteun. 'n Dokumentontleding is gedoen om insig te verkry rakende die huidige riglyne vir e-leer wat by uitgesoekte Suid-Afrikaanse universiteite gegee word. Die ontleding het getoon dat daar baie ruimte vir ontwikkeling is om die tradisionele klaskamerbeleide te skei van die aanlynleerbeleide by hoëronderriginstellings. Opsommings van aansoeke en hulpmiddele vir doeltreffende aanlynleer is voorgehou, sowel as aanbevelings vir ontwikkelings op die studieterrein en vir verdere navorsing.

Sleutelwoorde: afstandsonderrig, e-leer, inligtings- en kommunikasietegnologie, aanlynleer, pedagogie, onderrig, leer van Web2.0-tegnologie

ISISHWANKATHELO

Kolu phando lungenamhlaba ubanzi kakhulu kujoliswe ekufumaniseni iingcingane zemfundo zokufundisa nokufunda kwabo bafunda bekude besetyenzisa isixhobo sobuchwepheshe beintanethi esibizwa ngokuba yi*Web2.0*. Intsusa yolu phando iphuma kuluvo lokuba iNguqukazi Yorhwebo Yesine, i-4IR idala ukukhula okungummangaliso kwimisebenzi yezobuchwepheshe kunye nokuqanjwa kwezixhobo zobuchwepheshe bonxibelelwano lolwazi ezisetyenziswa ngabafundi abafunda bekude. Likhulile inani labantu abaqhagamshelanayo kwihlabathi liphela kwaye oku kunyuse inani labafundi abafunda bekude besebenzisa i-intanethi, ngenxa yokuba iphelisiwe imida yexesha kunye nendawo yokufundela. Ezi ndlela zintsha ziqanjwayo kwezobuchwepheshe zinefute elithe ngqo kwinkqubo yezemfundo, nedinga ukukhuliswa kweengcingane zokufundisa kwiiyunivesithi ezifundisa abafundi abafunda bekude, besebenzisa ubuchwepheshe be*Web2.0*. Kuye kwasetyenziswa indlela yophando ngokuzathuza (*qualitative*) ekuphengululeni uncwadi olungezona ngcingane zokufundisa zisetyenziswe kakhulu ngexesha elithile. Kusetyenziswe iinqobo zokufundisa eziyimfuneko ekufundeni nasekufundiseni ngeintanethi okusebenzayo, ukwenzela ukufumanisa ukuba zeziphi ezona zifanelekileyo kwimfundo yabakude kule nkulungwane yama-21. Kufunyaniswe ukuba akukho ngcingane yokufundisa inokusebenza yodwa ekufundiseni ngeintanethi, koko kunokusetyenziswa umxube – ngokushiyana kwemigangatho yawo – ukuze kuxhaswe imiba yokufundisa abafundi abahleli emakhaya bejongene neekhompyutha zabo. Kwenziwe uhlalutyo lwemibhalo ekhoyo ukuze kuqondisiswe ukuba zeziphi izikhokelo ezikhoyo zemfundo esebenzisa izixhobo zobuchwepheshe kwiiYunivevisithi ezichongiweyo zaseMzantsi Afrika. Olu hlalutyo lubonakalise ukuba usemninzi umhlaba ekufanele ukuba unyathelwe ukuze kwahlukaniswe imigaqo nkqubo yesiqhelo yokufundela egumbini lokufundela naleyo yokufunda ngeintanethi kumaziko emfundo ephakamileyo. Kuziswe ngaphambili izishwankathelo zeendlela zokusebenza kunye nezixhobo zokufunda okusebenzayo kubafundi abafunda bekude, kwacetyiswa kwakhona iindlela zokuphuhlisa neminye imiba ekusafanele ukuba kuphandwe ngayo.

Key words: Imfundo yabakude, Ukufunda kwikhompyutha, Ubuchwepheshe Bonxibelelwano Lolwazi, Ukufunda ngeintanethi, Ubuchule bokufundisa, Ukufundisa, Ukufunda ubuchwepheshe be*Web2.0*.

ACRONYMS

4IR	Fourth Digital Revolution
ICT	Information Communication Technology
JIT	Just in Time
LMS	Learning Management System
NQF	National Qualifications Framework
ODL	Open and Distance Learning
RSS	Really Simple Syndication

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION

The current innovation and growth of technology is rapidly changing the way in which all sectors communicate and interact as individuals and groups. This is due to the networks which have developed between people and organisations via technology. The global developments of the first three industrial revolutions which evolved from using mechanised, electric and automated productions have formed the foundation of a Fourth Industrial Revolution (4IR) which is evolving at an exponential rather than a linear pace (Schwab, 2015). Schwab (2015:1) also states that “the possibilities of billions of people connected by mobile devices, with unprecedented processing power, storage capacity and access to knowledge, are unlimited.”

This growth and transformation of technology has had a direct influence on the educational system and specifically on the institutions which offer distance education. Schlosser and Simonson (2002:5) state that “distance education is a planned and systematic activity which comprises the choice, didactic preparation and presentation of teaching materials as well as the supervision and support of student learning and which is achieved by bridging the physical distance between student and teacher by means of at least one appropriate technical medium.” The students consequently study independently through self-directed learning in their chosen setting.

In viewing higher education in the digital age, Xing and Marwala (2017) conclude that higher education in the Fourth Industrial Revolution is a complex, dialectic and exciting opportunity which can potentially transform society for the better. The growth of technology has removed the geographic and time constraints of teaching and will bring about essential changes to online education. The accessibility to information and rapid development of information in online sources have allowed students instant access who otherwise would not have had access to training material. Innovation in technology has also allowed for rapid growth of online students with an instant connection between the student and teacher on various platforms. According to Keegan (2019), since 2000, e-learning on a global scale has grown by 900% and is expected to triple in size from 2002 to 2025.

Educational institutions and organisations are pressured to remain relevant and up to date with the developments in technological growth, which brings about a different manner of online teaching while making use of various platforms. Wilson, Longstreet, Lin, and Sarker (2011) report that with technological growth in the last decade, the Web2.0 paradigm has grown significantly. The same authors (2011:4) further define Web2.0 as “the second generation of the Web, wherein interoperable, user-centred web applications and services promote social connectedness, media and information sharing, user-created content, and collaboration among individuals and organisations”. Although information can now be easily uploaded on various platforms, it does not however mean that this content and module planning is based on sound teaching and learning frameworks.

Higher education teaching methods are traditionally based on pedagogical theories that guide the methodology and enhance the learning experience. These theories and principles propose various ways in which knowledge is acquired by individuals, which are then applied by teachers to develop appropriate teaching methods. Many pedagogical theories and guiding principles have shaped a stable foundation on which distance education practice is based. The rapid changes in technology however, may exceed the rate at which educational theories evolve, leading to the notion that there is no single theory which can be exclusively applied to include the changes within technology experienced in distance education (Crawford, 2009).

1.2 BACKGROUND

Due to the rate of technological development and institutions accommodating the need for online education, Brown-Martin (2017:8) states that “rather than transforming education, teaching and learning, to meet the challenges of the 21st century we are witnessing a digitisation of 19th and 20th century practice to be delivered by 21st century platforms.”

It is therefore important to allow for innovation and evolution of educational theories and their effective application in higher education. In the current development of distance education when using Web2.0 technologies as a tool, there needs to be guidance to prevent online education from not evolving adequately. Xing and Marwala (2017:12) propose that “rather than fighting against new technologies and the associated novel teaching patterns, higher education

systems need to look at how they can accept them and transform the teaching and learning environment to the benefit of both students and academics.”

1.2.1 The Use of Web2.0 Technologies in Distance Education

The use of Web2.0 media in education allows students and teachers in higher education institutions to interact in dialogue which provides a platform to share personal and educational information. Susilo (2014:10) states that “social networking sites have become increasingly popular with the rise of Web2.0, providing increased collaboration and sharing among users through applications like wikis, blogs, podcasts and really simple syndication (RSS) feeds”. The creation of a learning community through this sharing of information via applications has significant benefits for online teaching platforms, as students may feel more connected in the learning environment.

Piotrowski (2015) suggests that due to the universal nature of interactive digital and mobile technologies, social media has transformed from being used informally in educational settings to gaining formal acceptance by students, faculties and administrators. The use of these platforms also allows teachers to include the latest online materials which will ensure that the coursework remains relevant to the technological advances and applications. Discussions and comments can be shared anytime and are not limited by location or time. Similarly, Brown-Martin (2017) suggests that this digital learning may be more engaging, less passive and more customised to different learning styles than traditional lecture-based learning.

Although Web2.0 technology has numerous benefits in education, there needs to be a pedagogical framework to guide the online interaction to ensure that the transfer of knowledge remains the primary objective. Due to the nature of Web2.0 technology, which is readily available, and the urgency for institutions to make use of online platforms, Xing and Marwala, (2017) explain that many courses permit students to download content with minimal or no modification to the teaching methodology or innovation. This leads to institutions mistakenly believing they are offering effective online learning experiences which may in fact, lack primary functions, guidance and support needed to ensure students receive an optimal online learning experience. When determining concepts that add to positive learning effectiveness, Roavi (2002) explores the medium of instruction, interaction, principles and student community, and states that, “it is course design and pedagogy that matter the most” (Roavi, 2002:6).

1.2.2 The Importance of Pedagogical Theories in Distance Education

The development of educational theories creates order and provides simplicity to recognise the purpose, methods and goals that guide educational practice. While deliberating on educational theories, Schlosser and Simonson (2002:10) state that “theory is important to the study of distance education because it has a direct impact on the practice of the field”. Similarly, Garrison (2000) notes that educational theories are invaluable in guiding the complex practices of a rational process of teaching and learning at a distance. Crawford (2009) also states that learning theories provide a solid foundation for a multitude of strategies and reasoning techniques needed for instructional designers to create meaningful learning systems. This implies that pedagogical theories provide a foundation for reasonable and effective planning for educators to ensure that students’ requirements are considered within the teaching process to allow for a good educational experience. Pedagogical theories have been applied to distance education, but with the method of communication between the teacher and student evolving from postal services to mass media and finally, interactive communication methods, these theories have been revised to meet the changes in distance learning.

1.2.3 The Development and Application of Pedagogical Theories in Distance Education

Crawford (2009), Prinsloo and Heydenrych (2010) and Anderson and Dron (2011), have identified different generations of distance education based on the technology utilised and the pedagogy that supports the learning experiences. When combining the developments in pedagogy with the industrial developments of technology, three generations of distance education with distinct pedagogies emerge. “The three generations of technology enhanced teaching are cognitive/behaviourist, social constructivist and connectivist” (Anderson and Dron 2012:1). Each of these generations are examined to identify the leading pedagogy and epistemological principles within each generation. These three theories exist as categories named after the pedagogical theories which support them.

1.2.3.1 The cognitive-behaviourist theories

According to Anderson and Dron (2011:6), “Cognitive, behaviourist pedagogy defined the first generation of individualized distance education.” Bates (2019) suggests that although the theory of behaviourism was developed in the 1920s, it still dominates approaches to teaching and learning as it places emphasis on pre-defined and measurable outcomes for the student.

Crawford (2009) elaborates that behaviourists build on the notion that external factors form learning and not the characteristics of the individual student.

Anderson and Dron (2011) declare that cognitive pedagogy arose in support of the need to motivate students, thereby expanding focus from behavioural to changes in knowledge and capacity of an individual's memory. This was adopted from the cognitive theory which highlights that learning takes place in sequential logical steps and requires the reform of the information at each step (Piaget, 1983 in Lefa, 2014). During this period of cognitive-behaviourist epistemology, distance teaching material was predominantly sent via post and in the latter part, telephone conferencing came into play. The major teaching theories which developed in distance education during this period included the theory of industrialisation (Peters, 1967) and the theory of independent study (Wedemeyer, 1971).

Peters (1988) focused his theory of industrialisation on emphasising the role of technology to reproduce high quality content to reach many students simultaneously, regardless of geographic distance. Peters (1988 as cited in Schlosser & Simonson, 2002:6), states that "distance teaching is a method of imparting knowledge, skills and attitudes which is rationalized by the application of division of labour and organizational principles as well as by the extensive use of technical media." Therefore, in modern terms, if a student has access to the internet, they should be able to access the learning material. Even though the industrialisation of teaching has had a significant influence on allowing distance education to be accessible to many students, according to Garrison (2000), it was not a theory of teaching nor of learning, but rather a contribution to clear thought about the organisation of distance education.

The massification of study material reaching many students who had to rely on self-study, led to the theory of independent study developed by Wedemeyer (1971). Wedemeyer (1971) proposed that teachers and students perform their essential tasks and responsibilities separately from one another, concentrating on individual students rather than a group. Although there is two-way communication, students can continue in their own environment and thereby apply self-directed learning. According to Garrison (2000:5), "the focus on the pedagogical assumptions of independent study was a shift from the world of correspondence study dominated by organisational and administrative concerns to a focus on educational issues concerning learning at a distance." The theory of independent study is widely adopted today

by faculties and institutions offering distance education as it allows the student to study autonomously in a student-centred learning environment.

According to Prinsloo and Heydenrych (2010), constructivism followed the cognitive-behaviourist generation, wherein the curriculum and pedagogy remained largely unchanged. Learning was later transformed by the first human-computer interaction with multimedia and computer-assisted learning and live television, which reached many students at once, leading to the constructivist model.

1.2.3.2 The constructivist theories

Crawford (2009) describes constructivist theory as being utilised when teachers create an environment which is stimulating for students to derive meaning for themselves. Constructivist theory encourages active student involvement, and allows students to express and reflect on the knowledge they have acquired and to build on it in creating a relevant new learning experiences, which allows students and teachers to use multiple modes of technology.

One of the major theories adopted during this age included the theory of guided conversation, as developed by Holmberg (1983), which suggests that good distance education bears a resemblance to that of a guided conversation which facilitates learning as there is continuous communication between the teacher and student. The theory of guided conversation underpins distance learning via Web2.0 technology where conversation takes place on various platforms between the students and teacher.

An additional theory developed during the generation of constructivist education is the theory of transactional distance (Moore, 1983). Moore (1983) recognised that there are restrictions to students who need to learn independently and subsequently suggested his theory of transactional distance. This pedagogical theory is composed of two variables, structure, and dialogue, where according to Garrison, (2000) the structure refers to the course design as well as the teaching and communication methodology used. The dialogue, according to Garrison (2000), refers to the communication methodology which should either be two-way communication or should make use of the theory of didactic conversation, as developed by Holmberg (1983). Moore (1983) further suggests incorporating the autonomy of the student which is the extent to which a student determines objectives, applications and evaluations.

The generation of theories based on constructivism, developed a methodology for dynamic conversations which formed the basis for the application of information communication platforms which followed in the era of connectivism. According to Prinsloo and Heydenrych (2010), these included multiple platforms of video-conferencing, sharing of resources via the internet and audio-graphics.

1.2.3.3 The connectivist theories

Connectivism, as the term suggests, proposes that learning occurs through the connecting of various nodes of information across networks. “An account of connectivism is therefore necessarily preceded by an account of networks” (Downes, 2012:18). Similarly, as defined by Marquis (2011) and Siemens (2004), connectivism incorporates the additional dimension that learning happens more rapidly in a connected, information-rich world through technological mediation.

Connectivism allows for a holistic learning method to break down barriers created in academic research fields. Marquis (2012) summarises the application of connectivism by stating that:

the theory of connectivism provides new insight into what it means to facilitate learning in the 21st Century. Those responsible for teaching and training need to incorporate instructional strategies that match student expectations and the physical changes that technology has wrought on the human brain.

A large opportunity exists for educational institutions to adapt to these changes in order to ensure that the teaching methods and content remain relevant. Connectivism can therefore add value and remain relevant to conducting research in online distance education, as new information and data is continuously being generated and captured. As information passes through each node in a connection, new information is uninterruptedly being added to these networks. Learning through these networks, leads to the development of the online collaborative theory (Harasim, 2017).

The online collaborative learning theory, according to Harasim (2017), provides a model of learning in which students are encouraged and supported to work together to create knowledge, to invent and explore ways to innovate, and by so doing, seek the conceptual knowledge needed to solve problems. The learning process is therefore evident in the understanding and

application of the content, rather than reciting it in summative assessments. Bates (2019) states that there is certainly enough evidence that collaborative learning can be achieved online, which is important, given the need for more flexible models of delivery to meet the needs of a more diverse student body in the digital age. Online collaborative learning bridges the gap between online learning and classroom-based learning by mimicking student teacher relationships with face-to-face learning environments.

Online collaborative learning allows knowledge to be something which students and teachers can collaboratively build, allowing students to establish and comprehend ideas in their unique learning style and space. Therefore, teachers and students feel comfortable to share ideas. There is, however, increased responsibility for the facilitator who needs to ensure that there is a relationship between the teachers and students to ensure that knowledge is shared and retained. They therefore need to guide the conversations and idea-organising phases to ensure that the correct content is covered. By harnessing the technology available as a learning tool, online collaborative learning will benefit teachers and students as they seek the commitment of shared understanding, commitment to development and commitment to expand the base of recognised facts when conducting research in open and distance learning.

The community of inquiry model for online learning is based on the concept that a social presence, cognitive presence and teaching presence are all essential to create a learning experience (Picciano, 2017). Bates (2019) suggests that the community of inquiry model is similar to online collaborative learning and describes the community of inquiry as a group in which students can work together and reflect on individual and shared understandings to construct personal connotations. This model of teaching and learning has become widely used in blended courses which are designed to be interactive while using discussion boards, blogs, wikis and video conferencing.

1.3 PROBLEM FORMULATION

The current technological growth is bringing about different means of online teaching; however, a lack of innovation and evolution of the foundations of teaching should not be at the expense of the student's learning experience. According to Garrison (2000), the pressing challenge facing distance education theorists is how to adapt current pedagogy to new realities

and where appropriate, to create new theory, as a single educational model to the field of online distance education in the 21st century.

The use of Web2.0 media in education is one of the leading changes in teaching and learning environments, even so, this use of technology needs to be coupled with appropriate pedagogy to provide a platform for effective teaching and learning. Higher education institutions, especially educators, need to plan to address uncertainties by discovering and adapting new ways and processes to enhance student learning, performance and satisfaction using information communication technology (ICT) and ensuring that teaching methods are innovative. Xing and Marwala (2017:14) state that “in general, innovations based on existing technologies are so-called evolutionary type; while revolutionary type of innovations focuses are inventions of new technologies.” To prevent institutions making use of 19th century teaching methods available through 21st century teaching technology, innovative ways of teaching accompanied with relevant pedagogical theories need to be identified and incorporated in distance education.

Although pedagogy has adapted to the changes in distance education, institutions do not have a single model from individual theories to guide the process of transferring knowledge in online learning. The purpose of this research is to review and evaluate existing educational theories and determine which theory or combination of theories is most suitable for supporting and sustaining teaching and learning with specific reference to using Web2.0 technology in distance education.

Although many industrialised processes still exist, one cannot negate the influence that pedagogy and epistemology have in the development of open and distance learning. The use of Web2.0 in education may be an ideal tool to bridge the gap in communication and massification of education. It is therefore imperative that the progress of teaching and learning at distance education institutions incorporates the interaction of student-student relationships, student-teacher relationships and the student applications and use of the chosen technology.

1.4 RESEARCH QUESTIONS

Against the above background, the main research question for the dissertation of limited scope is: *Which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education?*

Sub questions, which will guide the research based on the considered theories, aim to provide an appropriate answer to the main research question.

1. Which theories best support a learning environment when using Web2.0 technology in distance education?
2. Which theories best support a teaching environment when using Web2.0 in distance education?
3. What developments in theories need to take place to best support the use of Web2.0 in distance education?

1.5 RESEARCH AIM AND OBJECTIVES

The overall aim of the research is to determine which educational theories are most suitable and effective when using Web2.0 for distance education. The objective of the study aims at addressing the various objectives originating from the main aim:

Objective 1: To assess existing theories which best involve, support and communicate with students when using Web2.0 in distance education.

Objective 2: To evaluate theories which best support teaching and knowledge-sharing by teachers when using Web2.0 in distance education

Objective 3: To investigate principles in pedagogical theories to determine development areas to support the use of Web2.0 in distance education.

1.6 RESEARCH DESIGN

The study will focus on independent theories identified in Section 1.2.3. Research was conducted by means of a qualitative research design including an integrative literature review and document analysis. According to Mohajan (2018), qualitative research is a method of

research applied in social sciences that accumulates non-numerical data and aims to interpret meaning to aid in the understanding of social life through the study of targeted groups and places. The approach will make use of an interpretivist research paradigm. Kamal (2019) suggests that a research paradigm guides the researcher's study which includes the process of data collection and analysis. An interpretivist paradigm is applied throughout this study and is elaborated on in Chapter 3 Section 3.3.1. According to Pham (2018), by applying an interpretivist paradigm, the researcher would understand the phenomenon and its complexity in a unique context, instead of generalising an understanding for the whole population. These aspects of the research design are elaborated on in Chapter 3 Section 3.2 and 3.3.

Within qualitative research, phenomenology is applied as research design and is further elaborated on in Chapter 3 Section 3.3.2. The application of phenomenology aims to understand how and why events occur and furthermore refers to the experiences and perceptions people have within the phenomena occurring (Aspers, 2009). Koopman (2015) explains that the application of phenomenology allows data to be shared through experiences and in so doing, the researchers' bias and beliefs are removed to provide similarities within various experiences.

1.7 RESEARCH METHODS

The integrative literature review aimed to describe the relationship between the considered theories when using Web2.0 in distance education. It further attempts to identify emerging and adapted pedagogical theories which are appropriate for online distance learning in the 21st century. Literature was revised to determine the applications of the theories and their respective success factors when applied to distance education using Web2.0. By creating context in the application, accuracy and truthfulness of the material within the integrative literature review, suggestions towards an applicable theory or combination of theories used in distance education in the 21st century can be made. According to Whittemore and Knafl (2005:552), "integrative reviews include diverse data sources which enhance a holistic understanding of the topic of interest."

Document analysis also formed part of the research methods. Document analysis, according to Bowen (2009:27), is "a systematic procedure for reviewing or evaluating documents, both printed and electronic (computer-based and Internet-transmitted) material." The criteria for

inclusion of material were based on the literature and academic articles regarding educational policies and teaching methodologies which assess the effectiveness of educational theories in distance education. The research methods are fully depicted in Chapter 3 Section 3.4. A document analysis was conducted to determine which prescribed pedagogical frameworks are included in teaching and learning policy documents guiding education institutions offering online education. This data was used to compare epistemological standards utilised across different teaching environments (see Chapter 4 Section 4.6).

Policy documents which are available on the public domain from four recognised South African higher education institutions offering distance education were used to consider current pedagogy and epistemological methods proposed and applied to existing online distance learning courses. The online learning platforms used by the respective institutions were identified and examined in the document analysis. A complete selection of inclusion and exclusion criteria for the chosen institutions is elaborated on in Chapter 3, Section 3.4.1.4. An evaluation of the integration between the Web2.0 platforms and the effective pedagogical frameworks in distance education is included.

The integrated literature review and document analysis aim to identify common themes applied within the online learning environments.

1.8 TRUSTWORTHINESS

To ensure validity and reliability of the research, it is imperative to ensure that findings are constructed on evidence, that opinions can be justified and that all sources are available for validation of data presented. Trustworthiness in qualitative research, according to Shenton, (2004), is divided in four criteria of credibility, transferability, dependability, and confirmability. These criteria are further applied and elaborated on in Chapter 3 when outlining the research design and procedures for data analysis.

1.9 ETHICAL MEASURES

This research involves me as the academic student, the appointed supervisor, with data being obtained from published research and selected institutions' policy documents. The research carries no threat or harm to people or the greater environment. All conducted research complies

with the UNISA Policy on Research Ethics (UNISA, 2016) Ethical clearance was received through the College of Education at UNISA (Appendix A). All sources consulted and material reviewed are fully cited in the reference section of the research.

1.10 CLARIFICATION OF CONCEPTS

Within the context of this study, the following key definitions are provided for clarification:

Distance education

“Distance education is a form of education in which the participants in educational process – teacher and students are physically separated and communicate by different means and at different times” (Kiryakova, 2009:29). Prinsloo and Heydenrych (2010:6) note that “distance” in distance education refers to more than just the geographical distance between the delivering institution and its students; it also includes time, economic, social, educational epistemological and communication distances.

E-learning

According to Arkorful and Abaidoo (2014:397), E-learning refers to the use of information and communication technologies to enable the access to online learning/teaching resources.

Pedagogical theories

“Pedagogy is the art (and science) of teaching” (Bhowmik, Banerjee & Banerjee, 2013:2). Pedagogical theories provide philosophies that guide the methods within teaching, learning and evaluations. “Pedagogical theories are theories that postulate how things should be thought, how teaching should be done and/or how one can be brought to learn” (Rutto, 2017:2025).

Social networking used in education

Social media technologies include media sharing tools which can upload audio, photos and videos such as YouTube, Flickr and Myspace. These tools also make use of blogs, wikis and social networking platforms including Facebook, LinkedIn, WhatsApp, SlideShare and Skype. According to Bryer and Zavattaro (2011:327), “Social media are technologies that facilitate social interaction, make possible collaboration, and enable deliberation across stakeholders.”

Web2.0 technology

Wilson *et al.* (2011:4) define Web2.0 as “the second generation of the Web, wherein interoperable, user-centred web applications and services promote social connectedness, media and information sharing, user-created content, and collaboration among individuals and organisations.”

Online learning

Online learning is learning, which takes place via internet technology, providing distance education but not in a face-to-face set-up, is often synonymous with the term e-learning (Stem, 2015).

1.11 DIVISION OF CHAPTERS

The research study consists of 5 chapters which are structured as follows:

Chapter 1: provides an understanding of the necessity of a relevant pedagogical theory for online distance education when using Web2.0 technology in the 21st Century. The problem of the lack of an appropriate pedagogical theory supporting online education in the 21st century was formulated, together with research questions and objectives to consider throughout the study. The research design and methods were briefly discussed together with trustworthiness of the research and ethical considerations. A list of concepts used in the study is provided for the reader to clarify key words and definitions throughout the study.

Chapter 2: includes an integrated literature study of the principles of effective online teaching and learning followed by the main pedagogical theories applied from the origin of distance education to date. The principles for effective teaching and learning form a framework to understand the necessary conditions to stimulate an effective online teaching and learning environment. The literature study further includes the fundamentals of each pedagogical theory defined in Chapter 1 and the effective application in online distance education is briefly deliberated. Chapter 2 aims to provide context to aid in the answering of the research questions posed in Chapter 1.

Chapter 3: provides the reader with the research design and methods. The rationale for empirical research is provided to elaborate on the necessity for the study. The chapter defines the research paradigm, approach and type. Inclusion and exclusion parameters are defined with

the proposed methods of data collection and processing within the research methods. Trustworthiness and ethical measures are considered and steps are provided to be applied during the study.

Chapter 4: presents the interpretation of results by combining available literature of the nine chosen pedagogies with the requirements for effective online teaching and learning. Each condition for effective online teaching and learning is elaborated on. Document analysis on the policy documents of four South African universities is included to investigate the suggested pedagogy, teaching guidelines, design of learning experience and applied learning management systems.

Chapter 5: is the final Chapter and it presents a summary of the literature review, a summary of the empirical study and a synthesis of the research findings. In providing a conclusion to the study, each sub-question is answered, followed by an answer to the main research question. The study further elaborates on research limitations within the study. Recommendations are provided to various groups within the research and suggestions of further research are provided.

1.12 CONCLUSION

The first Chapter provided the background in the development and application of pedagogy applied in distance education in the last century. It is evident that up to the 21st century, educational theories have evolved in proportion to the technology advances of each generation but now are being left behind by the exponential developments in technology. The innovation in technology and the increase in student numbers registering for online learning in the dawn of the fourth industrial revolution was also presented. The foundations of contributing theories in distance education were briefly introduced. These existing principles within each theory form the basis of the research to identify an effective framework for innovative online teaching in the digital age. Chapter 2 explores the facts and applicable principles of each theory to online distance education by means of a comprehensive literature study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 introduced the importance, growth and evolution of educational pedagogy and theories applied to distance education. The rapid growth of technology and the increased amount of online distance education was presented. Certain aspects of pedagogical theories proposed can be used to provide a framework to guide institutions to develop and present innovative online modules.

The literature review in Chapter 2 first provides a summary of the requirements for effective online teaching and learning. Using these requirements, the literature study then presents a summary of the principles of each of the nine pedagogical theories introduced in Chapter 1 (Section 1.2.3) and addresses issues pertaining to the three research objectives to a) assess existing theories which best involve, support, and communicate with students online, b) evaluate theories which best support teaching and knowledge sharing by teachers when using Web2.0 in distance education, and c) investigate principles in pedagogical theories to determine development areas to support the use of Web2.0 in distance education. Each theory will be analysed to address the main research question in investigating which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education.

2.2 THE CONTEXT OF THE STUDY

The goal of the literature review is to assess the main pedagogical theories applied in distance education. The literature review aims to provide context in order to later determine which theory or combination of theories within the three generations of cognitive-behaviourist theories, constructivist theories and connectivist theories is considered most suitable for effective teaching and learning when using Web2.0 technology in distance education. In order to successfully determine this, the necessary conditions of effective teaching and learning in an online environment are considered. These requirements for effective online teaching and learning, and the characteristics of teacher and student centeredness are defined and briefly discussed. This provides context through which pedagogical theories can be applied to evaluate

which principles are best suited to enhance the teaching and learning experience in online distance education.

2.2.1 Requirements for Effective Online Teaching

Bangert (2004) and Cable and Cheung (2017) analyse the principles of good practice in online education developed by Chickering and Gamson (1987), which evaluate best practice in online teaching. These principles were derived from the experience of a panel of higher education scholars to improve learning (Bangert, 2004). The seven principles, as per Chickering and Gamson (1987), conclude that the effectiveness of student learning is dependent on teaching which encourages student faculty contact, collaborative learning, active learning, prompt feedback, time on task, high expectation and diversified learning. Downes (2012) states that although the principles were originally developed for effective face-to-face instruction, they translate well to provide guidance in online teaching classrooms. By investigating the requirements for effective online teaching, I aim to answer the second research questions posed: *Which theories best support a learning environment when using Web2.0 technology in distance education?*

Following an analysis of a decade of online teaching, Cable and Cheung (2017) suggest the addition of an eighth principle which includes technology and the application thereof. The framework of the eight principles addresses the notion of how teaching methodologies are applied and not necessarily the subject matter of what is being taught. These principles are presented in Figure 2.1 (Chickering & Gamson, 1987 cited in Cable & Cheung, 2017:3).

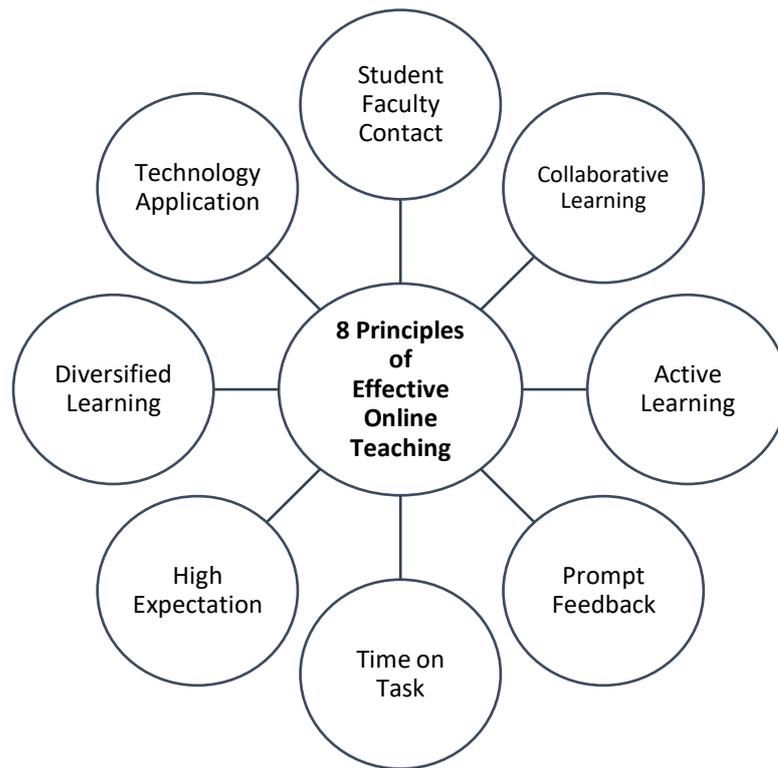


Figure 2.1: The principles of effective online teaching (modified from Cable & Cheung, 2017:3)

Findings from the research on the application of current online teaching practices include attributes or characteristics which can be classified within the eight principles. These principles are elaborated on in the work of Simonson, Schlosser & Hanson (1999) Bangert (2004), Simsonson, Smaldino, Albright and Zvacek (2008), Crawford-Ferre and Wiest (2012), Cable & Cheung (2017) and Rose (2018) and were used as a framework to evaluate the effectiveness of online teaching by providing a brief description of each principle. Furthermore, based on the extensive research conducted by Simonson *et al.* (1999), Bangert (2004), Simsonson *et al.* (2008) Crawford-Ferre & Wiest (2012), Cable & Cheung (2017) and Rose (2018) these principles were used as a guideline in Chapter 4 to evaluate which pedagogical theories include aspects which lead to effective online teaching and learning in the 21st century. Each of these eight principles, as depicted in Figure 2.1, are elaborated on.

2.2.1.1 Principle 1: Encourage student-faculty contact

“Frequent student-faculty contact in and out of classes is the most important factor in student motivation and involvement” (Chickering & Gamson, 1987:3). Similarly, Robinson and

Hullinger (2008) state that through more frequent and focused student faculty interaction, it is more likely that students will stay motivated. The concept of frequent communication from an institution or faculty gives the student support and a sense of belonging which proves that more students complete their studies (Rose, 2018). Students then feel that the faculty or institution is concerned about their personal learning journey which provides support and encourages students to remain committed. Cable and Cheung, (2017) mention that through communication with students, the teachers will gain an understanding of the area where students need assistance and guidance. This guidance supports students early on in their studies which decreases student drop-out rates (Rose, 2018). Likewise, Hathaway (2014) notes that students distinguish themselves in learning when interaction between themselves and the faculty is more frequent. This research therefore needs to identify pedagogical theories which promote two-way communication between the teacher /faculty and the student to encourage student-faculty contact.

2.2.1.2 Principle 2: Encourage collaborative learning

According to Chickering and Gamson (1987), the transfer of knowledge is more effective when working in a team than as an individual. Students who feel isolated during the journey of online learning have difficulty in successfully completing the online learning modules (Dreon, 2013). As a result of the developments which online platforms provide by breaking down geographical barriers, I feel that collaborative learning is made possible regardless of geographical time and space. Online teachers should therefore include course design to encourage student-student interaction which allows students to participate in group activities to share information and develop a sense of community. “Students who possess strong feelings of community are more likely to persist than those students who feel alienated and alone” (Roavi, 2002:12).

2.2.1.3 Principle 3: Encourage active learning

According to Cable and Cheung (2017), active learning makes students reflect on how learning is applied daily and thereby allows students to take ownership of their learning experience. The application of active student-centred learning in the online environment therefore is essential to allow students to study within their required time frame (Simonson *et al.*, 1999).

Bangert (2004) proposes that the principle of active learning requires students to select, arrange and share their experiences with existing knowledge to develop new cognitive ideas. Similarly, Crawford-Ferre and Wiest (2012) discuss the interaction amongst participants in online learning and concludes that “through facilitating respect and emotional integrity in a student-centred environment, the instructor can help students to develop positive and productive relationships with one another” (Crawford-Ferre & Wiest, 2012:12).

2.2.1.4 Principle 4: Encourage prompt feedback

Bangert (2004) argues that feedback from the course teacher is most effective if given within a short timeframe of the task submitted. Prompt feedback is important to allow students to know where to improve so that they can focus their energy early on and build on the information obtained. “Knowing what you know and don’t know, focuses learning” (Chickering & Gamson, 1987:4). Hathaway (2014) observes that feedback within the first week of class motivates and encourages students who would have otherwise have dropped out. Principles of pedagogy which guide the learning process through regular feedback will be of utmost importance to ensure an effective online teaching experience.

2.2.1.5 Principle 5: Time allocated per task

Moore and Anderson (2003) declare that many students choose online education as it allows for more flexible study solutions from home and in different geographic time zones, where students can choose when they are able to work on studies. However, Abell, Cain & Lee (2016) note that if students receive large amounts of work without clearly suggested timelines and due dates, they are more likely to become de-motivate and omit essential information. “To help students allocate a realistic amount of time on completing various learning tasks, educators have to define clear time expectations for them, which lays the foundation for high performance” (Cable & Cheung, 2017:4). Similarly, Abell, *et al.* (2016) state that a large portion of academic success is dependent on effective timelines for required goals, which increases the probability of academic success as it allows the student to incorporate effective time-management.

2.2.1.6 Principle 6: Set and communicate high expectations

Cable and Cheung (2017) provide evidence that where teachers communicate to students that there are high expectations, students inevitably perform at high levels. This could include clear guidelines on assessment requirements, feedback on outcomes and communication of improvement areas. This self-fulfilling prophecy motivates students and provides a challenge to each individual to work hard (Hathaway, 2014). The importance of setting such expectations in the process of effective online teaching and within the study is that it allows the teacher to determine the goal units and learning outcomes to measure students by and provides them with a guideline to base the assessment and progress on.

2.2.1.7 Principle 7: Diversified learning

Successful teachers make use of a large range of learning experiences to include various learning styles of students (Hathaway, 2014). Online learning inherently includes students from various socio-economic and geographical backgrounds and therefore each classroom environment has a dynamic group of individuals. Bangert (2004) proposes that by including an array of various learning styles, it provides the opportunity of including diverse preferences in the learning environment. Crawford-Ferre and Wiest (2012) similarly deliberate on effective online instruction in higher education and propose that due to the geographic and time constraints which are removed in online learning, attention must be given to the course design to support various international formats and differences in time-zones. Simonson *et al.* (1999) outline the characteristics of student independence and state that diversified learning offers students more opportunities and choices which allow individuals to adapt to suit their preference.

2.2.1.8 Principle 8: Technology application

Bangert (2004) suggests that the chosen interface and application of technology is vital, as students cannot experience a successful learning environment without engagement. Where applicable, courses ought to be re-designed to make use of effective technology and media platforms available; however, the chosen platforms need support student independence (Simonson *et al.*, 1999). Simonson *et al.* (2008) apply a careful selection of information communication technologies and suggest that just because a certain technological resource is

available, it does not mean that it is the best fit. Faculties need to use the correct technology to ensure students' learning experiences are enhanced (Cable & Cheung, 2017).

By developing a framework focusing on attributes adopted by teachers for effective online teaching, it is equally important to focus on the requirements of effective learning. Abell *et al.* (2016) identified learning preferences in students participating in online education and propose five essential attributes for student success. These attributes include student motivation, feedback, social interaction, learning preferences and technology (Abell *et al.*, 2016). Although these may seem to be a separate list of requirements to the principles discussed in Section 2.2.1, they do not have a linear relationship. An environment rather needs to be created where student requirements exist together with the principles of effective teaching. These requirements are elaborated on the subsequent section and provide the background to establishing an environment necessary for effective online learning which should be used in conjunction with the principles discussed in section 2.2.1.

2.2.2 Requirements for Effective Online Learning

The five concepts derived by Abell *et al.* (2016) (Figure 2.2) overlap with the eight principles developed by Cable and Cheung (2017), as outlined in Section 2.2.1. The concepts for effective online learning (Abell *et al.*, 2016) are reviewed to provide a background to effectively evaluate pedagogical principles in Section 2.3. The importance of including these requirements within the study are to assist in contextualising information needed to answer the first research question posed of *which theories best support a learning environment when using Web2.0 technology in distance education?*

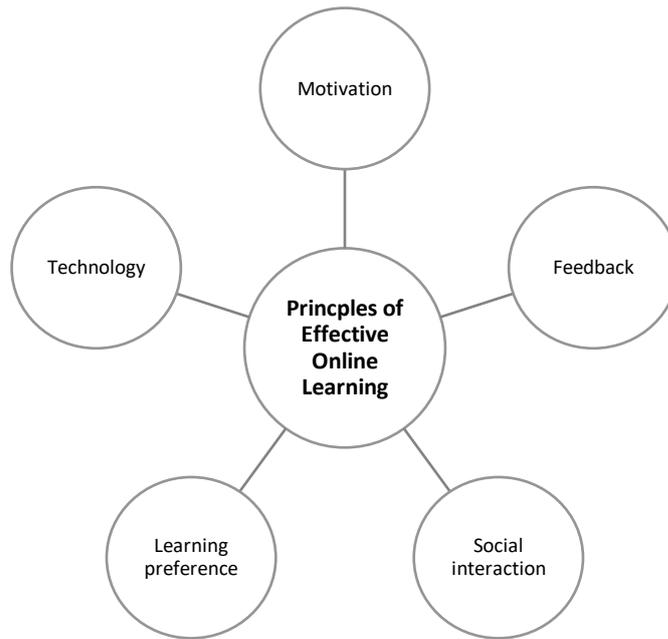


Figure 2.2: Essential concepts for effective online learning (Source, Abell *et al.*, 2016)

2.2.2.1 Motivation

For students to be successful and self-regulated, it is imperative that they are motivated throughout their studies (Abell *et al.*, 2016). Anderson (2008) outlines theory and practice of online learning and suggests that the effectiveness of online teaching is dependent on student motivation far above the effectiveness of study material and technology used. Most students rely on other motivated students to encourage and provide mutual support through online learning (Bates, 2019). Principles of pedagogy which support the motivation of students will be of utmost importance to be applied in online learning in the 21st century as it has a direct impact on the success rate of the students.

2.2.2.2 Student feedback

Abell *et al.* (2016) suggest that students who receive immediate and specific feedback experience a more stable learning environment. Correspondingly Simsonson *et al.* (2008) note that students who were individually addressed had a positive learning experience and were able to evaluate their online learning process more effectively. Feedback should provide information to the student as to areas for improvement, and should include the points of success for each student to enhance motivation (Simsonson *et al.*, 2008).

2.2.2.3 Social interaction

Simonson *et al.* (2008) state that faculties should take time to set up social interaction through collaboration with the teacher and students, which will benefit the learning experience by expanding their knowledge and by making students aware of other opinions which add value and depth to their learning experience. This concept of social interaction is mainly present in collaborative work (Abell *et al.*, 2016). Abell *et al.* (2016) suggests that a social presence is established when there is student-student and teacher-student interaction which provides a sense of community amongst the students in an online environment. Roavi (2002) provides evidence that the flow of information, student persistence, co-operations, course satisfaction and commitment is increased when there is a sense of community in distance education, thereby creating an environment for more effective learning online.

2.2.2.4 Learning preferences

Bates (2019) suggests that if students with different preferences are accommodated, it leads to a deeper understanding of content. Arkorful and Abaidoo (2014) share this standpoint and state that e-learning should consider the individual differences in students and that this is an advantage to students participating in online learning. An online environment should allow students to apply their preferences to the technology or portals utilised through customising interface, and that student interaction should be adjusted to accommodate individual preference (Anderson, 2008).

2.2.2.5 Technology

Simonson *et al.* (2008) suggest that the effective use of technological tools can provide a unique and active learning experience to students. According to Abell *et al.* (2016), for online learning to be successful, students need to have access and be able to use information communication technology on the various platforms applied by the institutions. The application of technology has allowed students to instantaneously receive information and pro-actively apply this information in collaboration with various sources which are readably available. This inherently leans towards the student taking ownership of the learning process, which is aligned with a more student-centred learning approach.

By using the teaching or learning practice as a foundation, Maganga and Ssenkusu (2019) propose that teacher-centred learning focuses predominantly on the involvement of the teacher and student-centred learning considers the experience of the student as the main objective. Teacher-centred approaches include mass communication and distribution of information from teachers to students who are required to memorise information for summative assessments in the form of tests and exams. In contrast, student-centred learning allows students to apply content and develop critical thinking skills in collaboration with each other (Maganga & Ssenkusu, 2019).

Roavi (2002) however, states that it is not the learning system which determines the effectiveness, but rather the course design and pedagogy. Pedagogical theory is a significant factor in distance education since it directly affects the practicality of teaching and learning (Schlosser & Simonson, 2002). Nine pedagogical theories and their principles are presented to assist in developing an understanding of the importance and application in online learning. The importance and application of student and teacher centredness within the study is also included in applicable pedagogical principles.

2.3 PRINCIPLES OF PROPOSED PEDAGOGICAL THEORIES

This section of the literature review aims to analyse and summarise the principles of significant pedagogical theories which support the current practice of distance education. Each theory will be reviewed according to the principles which guide the pedagogy and the application thereof in online distance education, will also be included. The works of Moore and Anderson (2003) in the *Handbook of Distance Education*, Anderson (2008) in the *Theory and Practice of Online Learning*, Keegan (2013) in *Foundations of Distance Education* as well as Bates (2019) in *Teaching in a Digital Age*, provide a foundation for the research in the application of pedagogy in online education. Each of these works focuses on the main pedagogical theories and principles applied in online and distance education. Using the pedagogical theories and their principles as a baseline, nine theories were selected to be included in this research.

Anderson and Dron (2011) investigate the three generations of pedagogy and state that “all past generations of distance education technologies, as well as the pedagogies that dominated their use, remain in effective use today” (Anderson & Dron, 2011:2). The following sections will briefly review each of the main theories of pedagogy which have been related to distance

education. These theories include cognitive-behaviourism, the theory of industrialisation, the theory of independent study, constructivist theory, the theory of guided conversation, transactional distance, connectivist theory, online collaborative theory and community of inquiry.

2.3.1 Cognitive-Behaviourism Pedagogy

Skinner (1976) focused his theory of behaviourism on observable and measurable actions and behaviour, in which he sees learning as a repetition of actions. He notes that “if knowledge is construed as a repertoire of behaviours, someone can be said to understand something if they possess the appropriate repertoire” (Skinner, 1976:157). According to Siemens (2004), behaviourism makes several assumptions which propose that behaviour is more important than understanding internal processes, that it should be focused on single concepts and that learning is brought about through a change in behaviour. Behaviourist psychology focuses on the aspects of behaviour that respond through observation and measurement, and thereby students learn through reward or punishment, the approach to learning which students needs to adopt is one of self-paced individual study (Bates, 2019). Similarly, Holmberg (2005) notes that in education, the principles of behaviourism are applied in a way that students are aware of the required objectives to be met after the teaching process. The behaviourist theory places emphasis on how the student’s environment influences the process of acquiring knowledge (O’Donnel, Sharp, Lawless & O’Donnell, 2015). Skinner (1976), notes that motivation in learning can be related to positive reinforcement through good results and feedback. Sidney (2015), when evaluating behaviourist learning theory for the 21st century, suggests that the behaviourist model forms part of a very traditional model in which the teacher guides the learning process. Similarly, Kaplan (2018) mentions that behavioural analysis and applied positive reinforcement in lesson design is essential in teaching. Anderson and Dron (2011) propose that behaviourist principles are effective in practical training at a distance as the learning outcomes are clearly measured.

Piaget (1968) addressed the notion that learning cannot be based on behaviour alone, and must also include a change in the mental process. He therefore proposed that knowledge is actively constructed by students based on their current setting. Piaget (1968) also noted that external motivation of behaviour needs to be coupled with an internal drive to monitor understanding. The cognitive school of learning, according to Anderson (2008), applies learning as a process

which relies on memory, thought processes and reflection, and where learning takes place via stimulation and applying various aspects of a student's memory. According to Bates (2019), the application of a cognitivist approach in education is "focusing on teaching learners how to learn, on developing stronger or new mental processes for future learning, and on developing deeper and constantly changing understanding of concepts and ideas" (Bates, 2019:78).

Holmberg (2005) notes that in the application of cognitive pedagogy in the 21st century, the principle of cognitivism is well-matched for distance education as it promotes student thinking. Cognitivism relies on the process in which individuals manage and make sense of new information in practical steps (Bates 2019). Bates (2019), when discussing a cognitive approach and application to distance education, lists five developments in teaching, which include intelligent tutoring systems, artificial intelligence, pre-determined learning outcomes, problem-based learning and instructional design.

Anderson (2008:6) summarises cognitive-behaviourist pedagogy and notes that "behaviourist strategies can be used to teach the facts (what), while cognitivist strategies focus on the principles and process (how)". Kaplan (2018) suggests that the work of Skinner (1976) can be applied in teaching strategies to stimulate cognitive thinking with the application of fun activities which include methods of positive rewards to reinforcing behaviour. The principles derived from cognitive-behaviourism pedagogy form the foundation of many traditional teaching and learning environments (Anderson & Dron, 2011; Bates, 2019; Sidney, 2015).

Anderson and Dron (2011) note that cognitive-behaviourist theories of teaching became popular in a time of distance education when communication was limited to one-on-one and one-to-many communication mainly via tele-conferencing and postal services. Anderson and Dron (2011) also indicate that cognitive and behaviourist pedagogies were the most prominent theories applied in education during the 20th century. According to Bates (2019), behaviourist and cognitive theories are prescriptive in that they are based on rules and students operate under conditions that tend to be out of their control.

Anderson and Dron (2011) investigated teaching and learning structures associated with cognitive-behaviourism pedagogy which guides the creation, application and evaluation of the learning process. They then investigated the effective application of online tools such as Google Docs, Wikis and Dropbox which allow for multiple authors when applying the

instructional design confirming that “today, each of the instructional design activities is enhanced by a host of Web2.0 tools” (Anderson & Dron, 2011:4). Bates (2019) also states that a cognitive-behaviourist approach “provides the underlying theoretical basis for the development of teaching machines, measurable learning objectives, computer-assisted instruction and multiple-choice tests,” (Bates, 2019:73). According to Anderson (2014), behavioural and cognitive learning is necessary, but alone, is not fully sufficient for 21st century quality education.

2.3.2 Theory of Industrialisation

According to Bernath and Vidal (2007), the theory of industrialisation was first developed in the 1960s but only published later in 1967 (Peters 1967). According to Keegan (2013), Peters (1967) focused on the concepts of a mechanised process of an institution developing materials. While studying these concepts of distance education, Peters (1967) realised that distance education and industrialisation are complementary to one another, and that the process of distance education can be compared to any industrial assembly line with a sequence of events. Peters (2010) suggested that by applying the theory of industrialisation, it transforms members into a part of a larger system. An effective online learning system would therefore have various parts which supports and develops the process and content, like that of an industrialised system with various integrated parts. Distance education can be seen as an efficient system which practises the principles of an industrialised establishment while applying technology to allow a large student group to be included in university study, irrespective of geographic location or occupation (Peters, 1967). Peters (1967 in Simonson *et al.*, 1999) states that the teaching process is structured through increased mechanisation and automation. Distance education is formulated as a result of an industrialised culture (Bernath & Vidal, 2007) with distance education and industrialisation being complementary to one another (Peters, 1967). In identifying the similarities between distance education and an industrialised process, various terminologies for effective distance education were developed for the theory of industrialised pedagogy (Peters, 1967, 1988, 2010). This terminology draws parallels between the application of online teaching in the 21st century compared to industrial processing. These terms according to Peters (1967) include, rationalisation, division of labour, mechanisation, assembly lines, mass production, preparatory work, planning and organising, formalisation, standardisation, change of function, objectification and centralisation.

- a) Rationalisation: In education, the efficiency of the authors, course developers, administrative staff, teachers and moderators all determine the success of the course which can be compared to the efficiency of a production line (Peters, 2010). Keegan (2013) notes that the rationalisation of teaching is when knowledge of a consistent quality is transferred from a teacher to an unlimited number of students.
- b) Division of labour: The division of labour is one of the biggest advantages of effective distance education as it divides tasks into simpler and more manageable components in the system (Simonsen *et al.*, 2008). Holmberg (2005) proposes that the division of work in distance education enhances the process by including individual specialists to ensure that high quality work is maintained in each stage of developing, teaching and evaluating the work.
- c) Mechanisation: Distance education in any form would not be possible without a form of mechanisation or use of mechanical equipment (Peters, 1967). Peters (2010) notes that in the 21st century, this is especially true as all students now make use of electronic devices to receive study material. Keegan (2013) similarly states that mechanisation has transformed the process of distance education with new methods being used.
- d) Assembly line/Accumulation point: This process is like that of a manufacturing line when the individual remains stationary while the products move past to be assembled. This is applicable in distance education as the material will follow a sequence of 'assembly' from the development of the material to the dispatching thereof by various individuals at stationary areas (Peters, 2010).
- e) Mass production and distribution: The demand of learning material exceeds the supply thereof in distance education, and therefore the mass production and supply of courses has led to an analysis of the students' needs and subsequently to an increase in quality (Schlosser & Simonsen, 2002). This concept of mass production and distribution, according to Peters (2010), is prevalent in the 21st century as distance learning institutions have a centralised office which distributes learning material to a large and geographically diverse group of students.
- f) Planning and preparatory work: Peters (1967) in Simonsen *et al.*, 1999), referred to the understanding of how each function in a system relates to one another during the production phase. The development of distance education is dependent on the detailed relative planning thereof, from the first action to the final inputs (Schlosser & Simonsen, 2002). Peters (2010) states that in distance education the planning needs to be done in a strategic way as it affects many students.

- g) Standardisation: According to Schlosser and Simonson (2002), this principle in industrialisation is based on the manufacturer making one product only, which is at a lower cost to produce and is more fit-for purpose. Karatas, Karatas and Kaya (2016) mention that more standardisation of distance education is needed than that of face-to-face environments. “In distance education, all the points in the cycle, from student to distance teaching establishment, to the academics allocated, must be determined exactly” (Schlosser & Simonson, 2002:13).
- h) Functional change and objectification: This principle is comparative to the use of machinery to mass produce and improve standardised objects which can be run automatically (Peters 2010). Peters (2010) also mentions that in distance education, this principle is especially relevant as teaching can be multiplied, mass produced and can continuously be improved to be sold to students. According to Keegan (2013), the role of the teacher can be divided in three various aspects, author, evaluator and adviser.
- i) Concentration and centralisation. Schlosser and Simonsen (2002) note that a centralised administration for distance education is able to serve many students, which is more cost effective. Peters (2010) suggests that for an institution to be successful in distance education, investments need to ensure that experts and specialists need to be focused and committed to one corporation and location.

Peters (2010) notes that there are eight steps which are essential when teaching via distance, including: “intensive and long-range planning, instructional design, development of writing of self-instructional teaching material, production of this material, recruitment of the students envisaged, distribution of the material, shipping it, corresponding with the learners, correcting and marking assignments, and administrating, including investing the necessary funds” (Peters, 2010:14).

The theory of industrialisation highlights that distance education must allow students to be autonomous, as it allows for future growth of ICT as it includes information-driven education which is more robust and flexible in the quick changing digital revolution (Peters, 2010). Peters (2010) also states that the digital era of information does not lead to an end in industrialisation, but rather that supports and escalates the theory as distance education has been more robust in adopting available technology than face-to-face learning.

2.3.3 Theory of Independent Study

Wedemeyer (1971) formulated the theory of independent study and proposed that four elements need to exist in a distance learning environment. These include a teacher, a student or students, a communications system or mode and something to be taught or learned. Schlosser and Simonson (2002), in summarising the theory by Wedemeyer (1971), note that the critical aspect of successful distance education is a relationship amid the teacher and student.

Wedemeyer (1971) proposes that the system for distance education should be able to accommodate students or one student regardless of whether there are teachers available at the same place and time which therefore places more responsibility of learning on the student. Independent study should allow teachers to be more focused on education and the transfer of knowledge, offering students a larger variety of courses while making use of effective media technology and platforms to ensure that each subject or topic is taught in the best possible way rather than on administrative duties. When applying the theory of independent study, there should be allowance for the programme courses to fit into an articulated media programme which can adapt to individual student preference and pace and will assess students on correct progress and not be concerned with time, place or sequence which may create barriers (Wedemeyer, 1971).

Characteristics suggested to minimise the barriers which arise in teaching in distance education created by the variation geographic location in time zones have been recommended by Wedemeyer (1971), Simonson *et al.* (1999), Schlosser and Simonson (2002) and Keegan (2013). These characteristics propose that while the teacher and student are geographically divided, the traditional methods of teaching and learning via writing are continued using a different platform. Teaching is focused on the individual student's activity allowing the student to have freedom and responsibility to work at their own pace in their personal setting.

Based on the concepts, Wedemeyer (1973 in Keegan, 2013) notes that it is imperative to take into account the social and cultural distance as well as the geographical distance. Keegan (1976) depicts a classroom teaching and learning environment as a box which encompasses four elements (see Figure 2.3). Within this classroom environment depicted in Figure 2.3, communication is restricted to only speech and the curriculum can only be shared by the chosen pace and methods of the teacher at a given time. The concept of allowing for a varied physical distance, various modes of delivery and varied pace of learning by the student is not considered.

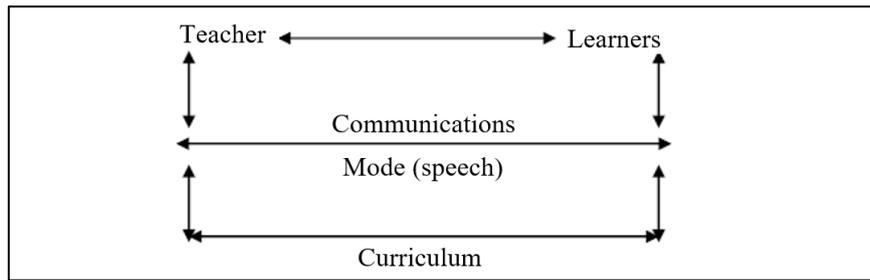


Figure 2.3: The classroom as a teaching-learning situation (Source Wedemeyer 1973 in Keegan 1976:63)

To accommodate the physical distance of distance teaching, Keegan (1976) further proposes an altered teaching-learning situation (see Figure 2.4). In this teaching and learning process depicted in Figure 2.4, the amount of student independence in the learning process is increased, as students are not reliant on one method of communication. Various modes of communication together with increased student autonomy, allow for a more inclusive student group regardless of geographic location.

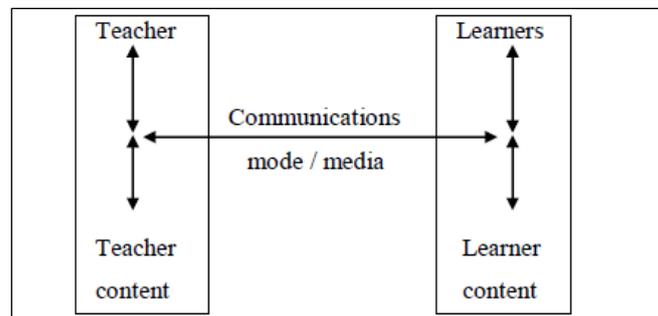


Figure 2.4: Teaching-learning model to accommodate physical distance (Source, Wedemeyer 1973 in Keegan 1976:64)

Keegan (2013) notes that Wedemeyer’s theory of independent study did not take into account television, telephones, computer radios unless under strict conditions, and states that if these technologies are used to reproduce a face-to-face learning environment without increased freedom and opportunity for the student, it is not classified as independent study. Holmberg (2005) notes that independent study does not propose that students have infinite freedom but rather that there is guidance from students, tutors and teachers, as the amount of guidance decreases so the independence increases. This aspect can be seen in independent study

application in distance education in the use of teleconferencing, live videos, television and web-based learning (Perdue, 2003).

2.3.4 Constructivist Theory

Constructivist applications started influencing thinking and methodology in distance education toward the end of the 20th century (Holmberg, 2005). Constructivist pedagogy is based on the premise that students develop their own understanding from personal experiences, which guide students to reflect, create knowledge, formulate discussions and share views and information built on a mutual understanding (Bangert, 2004; Bates, 2019; Crawford-Ferre & Wiest, 2012). According to Granger and Bowman (2003), a constructivist approach allows students to gradually work towards their goals which are aligned with the larger programme. “Learning environments are constructivist only if they allow individuals or groups of individuals to make their own meaning for what they experience rather than requiring them to ‘learn’ the teacher’s interpretation of that experience or content” (Granger & Bowman, 2003:177). Harasim (2017) notes that when applying constructivist principles, the student creates knowledge by interacting with the surrounding community. A constructivist approach supports a student-centred learning style where students learn through sharing and engaging in activities in which they are interested (Kain, 2018). According to Duc (2012), the process of delivering a course withing a constructivist approach consists of three major phases, analysis, design and evaluation. The process is not linear and occurs in a spiral, building up each aspect which consist of analysis, design and evaluation (see Figure 2.5).

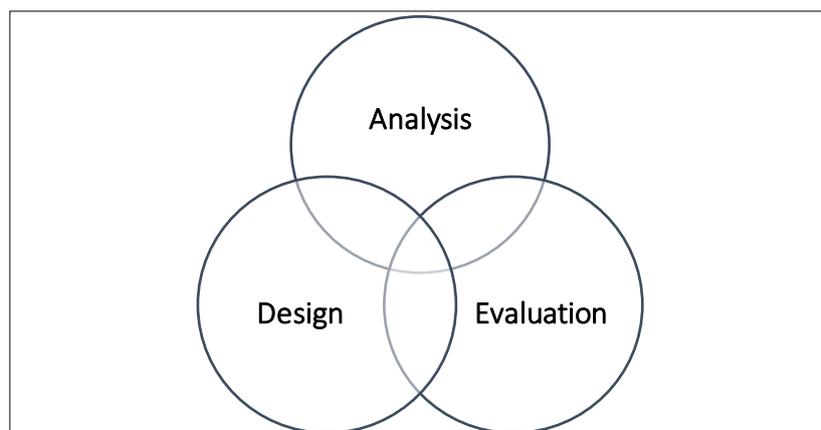


Figure 2.5: The process of course design within constructivist pedagogy (Source, Duc, 2012:18)

- a) Analysis: Teaching by means of constructivist theories places emphasis on students developing meaning by means of reflection, and then progressively building knowledge through deliberate mental stimulation (Bates, 2019).
- b) Design: The design in developing a module using a constructivist approach, needs to generate a setting which stimulates students to formulate knowledge and opinions which lead to the process of creating individual meaning (Crawford, 2009). The institution acts as a designer of the process by distributing learning material (Granger & Bowman, 2003).
- c) Evaluation: Crawford (2009) notes that evaluation in constructivist pedagogy does not make use of a single solution to a problem. Students are rather encouraged to formulate and justify the journey which leads to individual solutions. According to Crawford (2009), the evaluation process is more effectively a continuing process rather than an assessment at the completion of the course.

Holmberg (2005) states that a constructivist approach allows students to be active contributors in the teaching-learning progression rather than passive recipients. Similarly, Bangert (2004) proposes that in constructivist learning, both teachers and students play an active part in providing support and taking responsibilities in the online learning process. Crawford-Ferre and Wiest (2012) suggest that students develop their own understanding through fruitful and communicative work with others. The learning process needs to be based on realistic and current climate where students can feel part of a community dealing with realistic problems (Granger & Bowman, 2003). The role of the teacher therefore, changes from building the content of the course to connecting with students to allow each individual to construct knowledge that they can identify with. Technology has allowed constructivist strategies to be well applied by mentors who can continuously assist students in creating meaningful connections (Ganger & Bowen, 2003). In online learning in a constructivist environment student should be encouraged to actively engage in a meaningful learning process and through collaboration in this constructive learning process by developing new knowledge and personal understanding (Ally, 2008).

The curriculum in a constructivist environment is dynamic and should accommodate changing contexts within changing perspectives (Granger & Bowman, 2003). Harasim (2017) proposes that the use of Web2.0 technology in wikis, blogs and social media allows students to work

within a communal setting which encourages social interaction and sharing of knowledge while learning in a constructivist environment.

2.3.5 Theory of Guided Conversation

Holmberg (1983) was one of the first theorists who proposed that a distance education course must inherently be different from a textbook. This means that distance education courses should be not be a substitute for the textbook, but “should be in the form of a didactic conversation, fostered by well-developed self-instructional material and two-way communication at a distance” (Holmberg, 1983: 114-115). This has been beneficial to the development of distance education as it has allowed practitioners to creating distance learning materials and course work which is significantly different from classroom-based learning (Keegan, 2013). Holmberg (1983) defines his theory as education which is based on individual learning in which the student is guided by mediated conversations based on the module content. Schlosser and Simonson (2002) note that the theory of guided conversation adds value in that it relates teaching efficiency to the effect of being part of, and co-operating in a community while allowing students to have differing opinions. According to Keegan (2013), Holmberg’s view is that the most essential component of distance education for the individual student is two-way communication above all other aspects, including assessments, groupwork and administration which support the function of learning. Holmberg (1983 in Keegan, 2013) defines the supporting relationship between the institution and the student as guided conversation with the aim that a fruitful conversation will facilitate learning. Maganga and Ssenkusu (2019) propose that the dialogue between the students and teacher allows the students to express themselves and their experiences and as such, experience student-centred learning. Seven points are proposed to form a foundation for the theory of guided conversation (Holmberg, 1983; Keegan, 2013; Schlosser & Simonson, 2002):

- a) That a relationship between the teacher and student enhances student motivation and the perception of the course.
- b) That the relationship can be maintained and built at a distance through self-instructional material and communication.
- c) That motivated students are more likely to achieve their academic goals
- d) That a friendly conversation will build the relationship referred to in point a.
- e) That instructions delivered though conversation is more easily recalled and understood.

- f) That conversation necessary for building a relationship can be achieved through technology and media applied in distance education.
- g) That sufficient planning and guidance is necessary for organised learning, which can be achieved through the setting of goals.

Keegan (2013) illustrates that the concept proposed by Holmberg (1983) can diagrammatically be represented (see Figure 2.6).

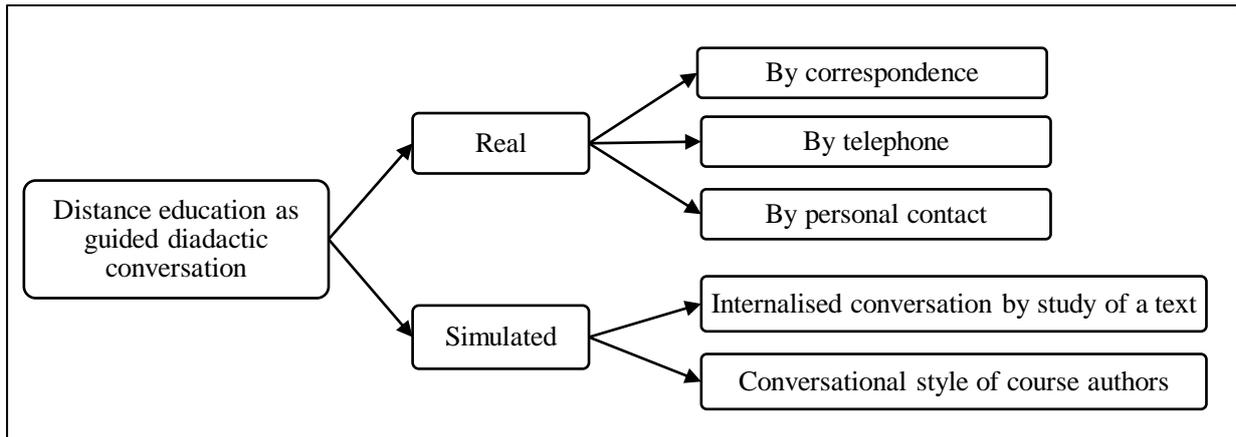


Figure 2.6: Diagrammatic illustration of the theory of guided conversation (Source, Keegan, 2013:102)

Keegan (2013) summarises the characteristics of learning guidance which will motivate students and facilitate the transfer of knowledge via online learning when applying the theory of guided conversation. These characteristics include that expectations to students should be clearly articulated, content should be easily available and well-presented using various themes and methods which considers individual learning styles allowing the students to include their opinions and personal interests (Keegan, 2013).

2.3.6 Transactional Distance

Moore (1983 in Keegan, 2013) wished to develop a theory of distance education as a separate field of education, which included carefully planned and organised teaching and learning outside of a classroom environment. Moore (1993 in Roavi, 2002), recognised that transactional distance is different for each person, and went on to define transactional distance as the “psychological and communications space between learners and instructions” (Roavi, 2002:7). Moore (2018) discusses the theory of transactional distance and proposes that it is

made up of three principles, namely dialogue, structure and transaction. Moore (2018) then suggests that the transaction in distance is the connection and relationship which is established between teachers and students while they are separated and need to communicate via technology. Moore (2018) also notes that the way in which the course is organised during this communication refers to the structure, and the use of communication technology platforms for learning, refers to the dialogue. Simonson *et al.* (1999) elaborate on these points and states that dialog refers to the two-way communication, and the structure refers to how responsive and the amount of control the instructions exercises within the needs of the student.

Moore (2018) summarises transactional distance by stating that “transactional distance is the gap between the understanding of a teacher (or teaching team) and that of a student, and distance education is the methodology of structuring courses and managing dialogue between teacher and student to bridge that gap through communications technology” (Moore, 2018:34). More structure increases the perceived distance and decreases the sense of community, moreover if the amount of dialogue between the student and teacher is increased, the perceived distance decreases and the sense of community is increased (Roavi, 2002). These concepts of structure and dialogue, according to Moore (2018), can be diagrammatically represented as in Figure 2.7.

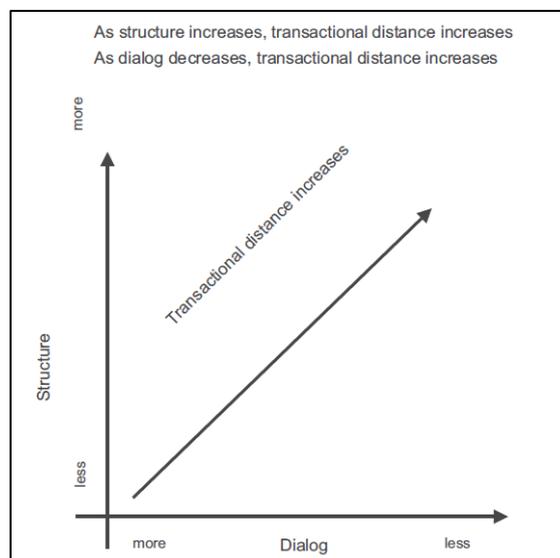


Figure 2.7: Relationship of dialogue and structure in transactional distance (Source, Moore 2018:38)

Simonson *et al.* (1999) suggests that as a result of the distance between the student and teacher, there is a higher degree of responsibility on the student to take ownership of the learning

process. Similarly, Moore (2018) notes that in every programme, it is essential to determine where the control lies between the teacher and student. Keegan (2013) elaborates on the control and proposes that the student is autonomous and geographically separated from the teacher whereby communication needs to take place by a non-human mechanisation. The greater the transactional distance, the more opportunity (and necessity) for the learners to exercise autonomy” (Moore, 2018:39). Moore (2018) also elaborates on the relationship of student autonomy and transactional distance and explains that in a course where there is low transactional distance, students need frequent dialogue and guidance to suit their needs and similarly, students with higher autonomy, require less dialogue and more structured material. This relationship is depicted in Figure 2.8.

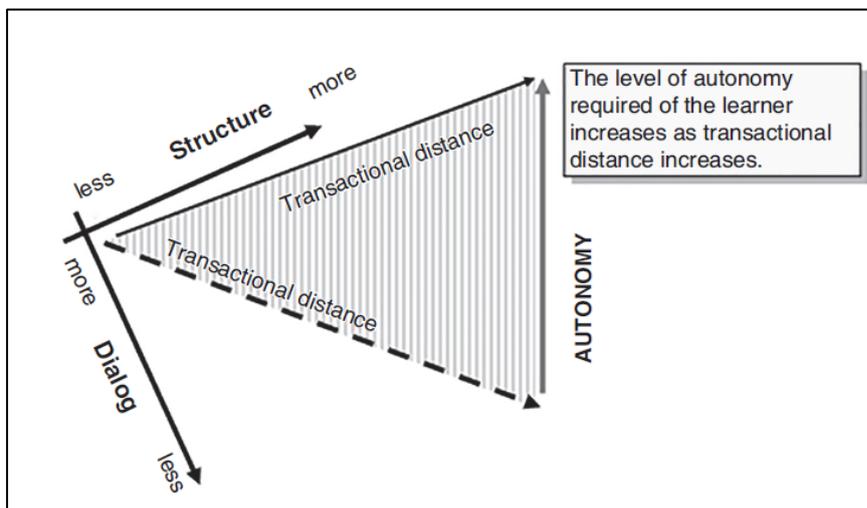


Figure 2.8: The dimensions of transactional distance and student autonomy (Source, Moore 2018:39)

As distance education consists of three components, the student, a teacher and a mode of communication (Moore, 2018), “to deliver teaching programmes that are maximally effective in overcoming transactional distance, it is necessary to select the appropriate medium to provide each teaching process with the appropriateness being dependent in part on other variables in the transactional environment, such as student characteristics and content characteristics” (Moore, 1997:27). Bernath and Vidal (2007) further propose that the relationships within transactional distance theory according to Moore (1983), are populated with typical programmes and methods for technology which depict the capacity for individualisation together with the relationship between structure, dialogue and transactional distance (Figure 2.9).

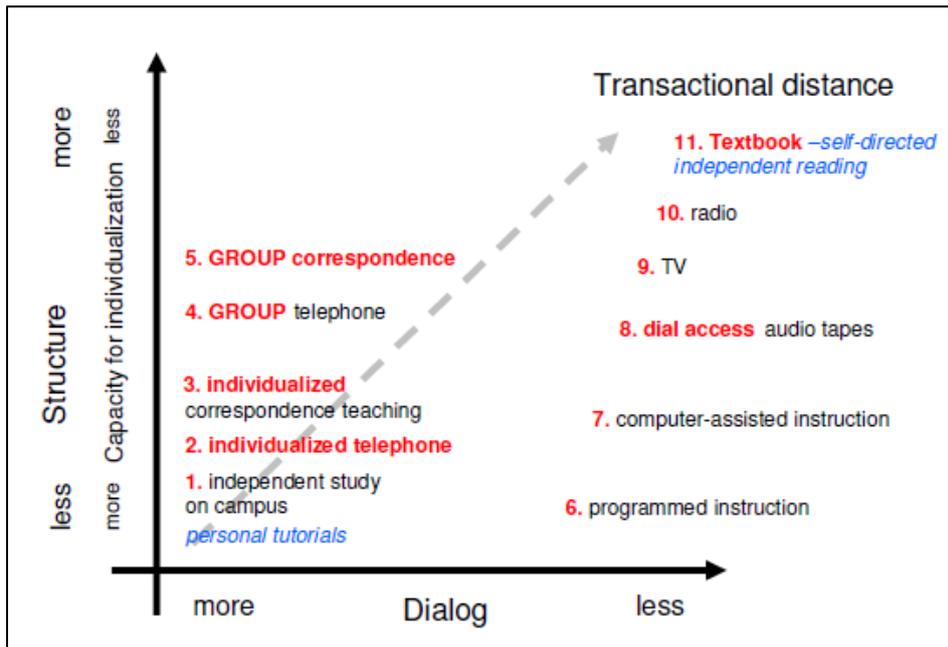


Figure 2.9: Relationships between structure, dialogue and transactional distance by technology used (Source, Bernath & Vidal, 2007:439)

In this diagram, it is suggested that the capacity for student individualisation is at its maximum, similar to that of independent study on campus when there is less structure and more dialogue. The capacity for individualised teaching decreases and thus group work is utilised when the amount of structure and transactional distance increases. In a similar way, as the structure increases and dialogue decreases, so the capacity for individualised teaching is less while transactional distance increases, teaching resources then include greater use of independent reading, radio, TV and audio broadcasts.

Moore (2018) creates an order for his typology, depicted in Figure 2.10 below, which suggests that an online programme can only exist with a certain degree of student autonomy. The autonomy is determined by the amount of external control which the teachers have within the process. It is suggested that students should have full autonomy within the programme but also indicates that on the opposing spectrum that programmes realistically cannot exist if students are free from faculty influence.

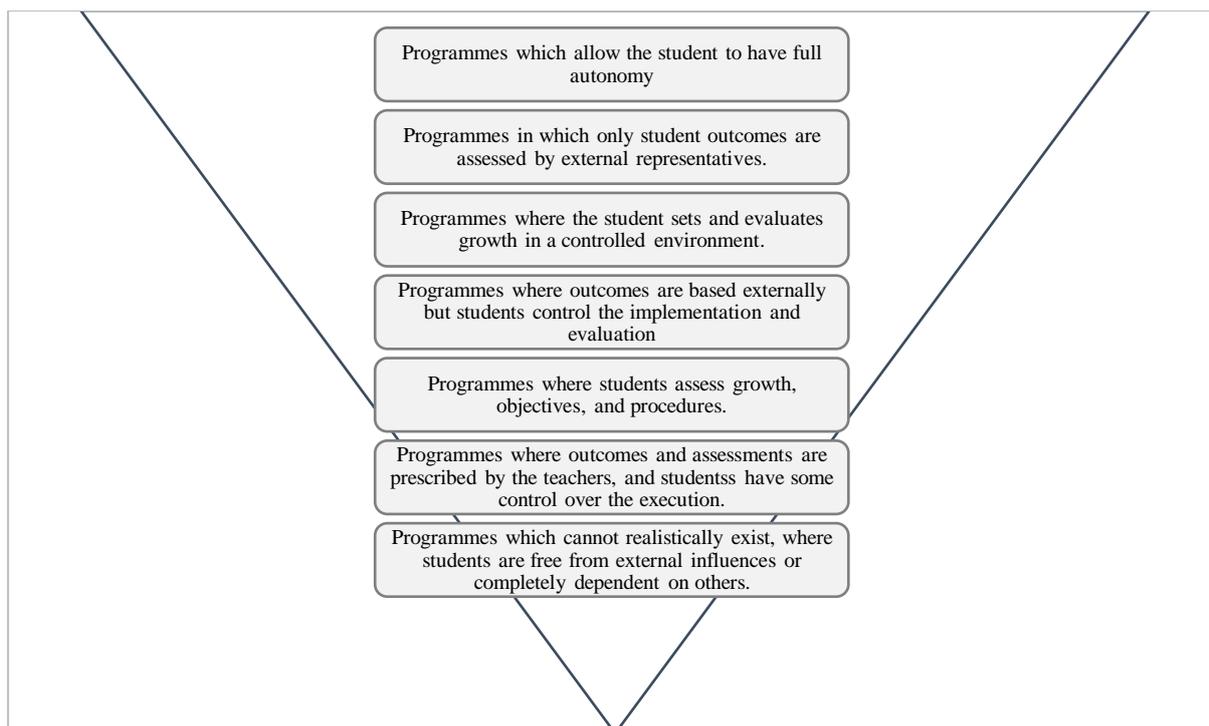


Figure 2.10: Hierarchy for typology in transactional distance (Source, Moore, 2018)

Moore (1983, 2018) proposes that realistically, all teaching programmes should fit between the theory of structure and dialogue. Roavi (2002) recommends that to manage the amount of structure and dialogue, all students participating in online education should be evaluated on timeous contributions to online platforms as well as the quantity and quality thereof. One can design modules for various degrees of student autonomy by varying the amount of dialogue and structure. The advances in technology have provided potential for more dialogue which have led to a new form of student-student autonomy which will reduce the transactional distance for each student (Bernath & Vidal, 2007). The increase in dialogue between students and teachers has allowed individuals and groups to be more connected within a community, which has led to an environment where information can be shared across various networks formed during the teaching and learning process, leading to the theory of connectivism.

2.3.7 Connectivist Theory

According to Crawford (2009), the theory of connectivism is an academic framework that assists in the understanding of learning where students form part of a community in which knowledge is deliberated and shared. Siemens (2004) proposes that connectivism provides a model to facilitate learning in the digital era by harnessing connection and utilising various

sources of information as they become available. Connectivism suggests a pedagogy which aims to utilise networks and identify practices that lead to these networks (Bates, 2019). According to Bates (2019), the theory of connectivism is applicable in a digital environment, where the teacher provides an environment for learning. This context brings the students together and allows them to develop successful networks within each individual environment, with the assumption that learning will then occur automatically within the flow of information and the reflection of each student.

Siemens (2004) asserts that new information is continually becoming available and that the theory of connectivism is fielded by the knowledge that decisions are based on rapidly changing environments. Siemens (2004:4) thus proposes eight principles of connectivism:

- a) Learning and knowledge rests in the diversity of opinions: According to Ally (2008), due to the access to the internet for all people across the world, information can be easily shared and reviewed by multiple subject matter experts.
- b) Learning is a process of connecting specialised nodes or information sources: Utecht and Keller (2019) propose that this concept allows students to use data and information available to them to gain a more comprehensive understanding, to create new ideas, data and findings and in collaboration with institutions and communities, can revolutionise higher education institutions.
- c) Learning may reside in non-human appliances: Information for learning in the 21st century has become too intricate for humans to process without assistance, and therefore students need to make use of networks within technology and communities to accumulate and access knowledge (Siemens, 2004).
- d) Capacity to know more is more critical than what is currently known. As information continuously becomes available in various forms on the internet and in datasets, the relevance and precision changes with new information and findings, therefore the ability of an individual to build and understand this knowledge will also continuously change (Giesbrecht, 2007).
- e) Nurturing and maintaining connections are needed to facilitate continual learning: Collaborations do not occur naturally, students need to foster relationships for effective collaborations which can occur anytime and anywhere across time and space (Utecht & Keller, 2019). Successful networks are diverse, allow for independence, directness, and connectivity (Downes, 2012).

- f) Ability to see connections between fields, ideas and concepts is a core skill. Ally (2008) proposes that students need be able to adapt to information being shared in various materials and fields to assist students to build knowledge and make connections in diverse learning settings.
- g) Currency (accurate, up-to-date knowledge) is the intent of all connectivism learning activities: Siemens (2004) mentions that in applying connectivism, it begins with each individual student who forms part of the cycle of developing knowledge in various networks to remain current.
- h) Decision-making is itself a learning process: According to Crawford (2009), as students research on the internet, they are exposed to an infinite amount of data and knowledge, and it is imperative that students learn to recognise valid, reliable sources amidst all the information available.

Siemens (2004) proposes that a new approach is needed in teaching when using a connectivist model, which means that teachers need a different approach in knowing that the complete knowledge of subject matter is not contained in one person. The teacher's role in applying connectivism, according to Siemens (2004), is therefore more in managing information obtained by students to ensure the desired outcome is reached. Connectivism allows students the ability to interact via social networking and collaboration tools such as Web2.0 technology (Giesbrecht, 2007). Various methods need to be applied to allow for the students to understand and build knowledge by finding relevant data and filtering unnecessary information (Giesbrecht, 2007). An example of application is of students collaborating to create notes which allowed students to share and build on ideas regardless of place and time and led to large groups of ideas and knowledge instantly shared beyond just what was taught by the teacher (Utecht & Keller, 2019). According to Crawford (2009), the use of the internet in distance education has allowed for the formation of communities regardless of geographical distance between students. Crawford (2009) proposes that in developing a framework for programmes of online learning, developers need to consider that modules should incorporate collaboration between the teacher, the student and the technology applied. The influence of the internet offers students the opportunity to connect with others, where students can include notes in Google Doc or Office 365 and instantly connect these notes with others who collectively rely on the collaborating community (Utecht & Keller, 2019).

2.3.8 Online Collaborative Theory

According to Bates (2019), following the development of constructivist approaches to learning, together with the use of the internet for online learning, Harasim (2017) introduced the online collaborative learning theory. Harasim (2017) describes her theory of online collaborative learning as a model of learning in which students are encouraged and supported to work together online to create knowledge: “to invent, to explore ways to innovate, and, by so doing, to seek the conceptual understanding and knowledge products needed to solve problems” (Harasim, 2017:117).

Harasim 2017 identifies three core principles of learning through online collaborative learning as presented in Figure 2.11.

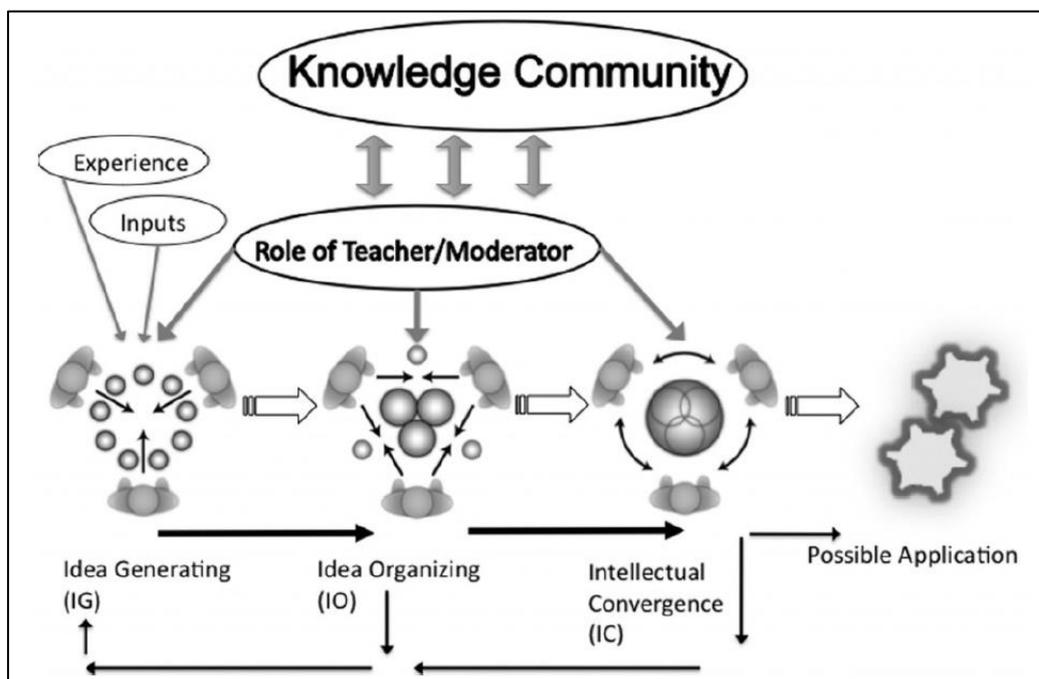


Figure 2.11: Core principles of learning through online collaborative learning (Source, Harasim, 2017:124)

These core principles comprise

- Idea generating:** According to Bates (2019), this is the process to generate ideas and brainstorm various opinions within the group.
- Idea organising:** Students classify the ideas into various themes and opinions through discussion (Bates, 2019).

- c) Intellectual convergence: In this step, students synthesise the work and formulate a final synthesis or document of their opinions (Harasim, 2017).

Bates (2019) notes that following these three steps, the student has only just started the process of generating ideas and constructing knowledge. O'Donnel *et al.* (2015) proposes that the effectiveness of online collaborative learning using discussion boards, live videos and conferencing creates a platform for students to interact and collaborate to create a learning experience. Teachers and students build and transfer knowledge through collaboration (O'Donnel *et al.*, 2015). Bates (2019) notes that discussion platforms form a fundamental element of teaching in online collaborative learning as the principles suggest that theory is highly communicative.

Garrison Anderson and Archer (2003) suggest that the application of asynchronous and synchronous information communication technology has allowed for higher collaboration in distance education. According to Bates (2019), the teaching methodology in online collaborative learning is dependent on the quality of communication between the teacher and student. Teachers need to remain responsible to collaborate with students to ensure balance of control for students to achieve meaningful outcomes (Garrison, Anderson & Archer, 2003). In online collaborative learning, students create and evaluate their own process of learning in virtual groups (Anderson, 2008). Computer conferencing and the connections provided through 21st century learning management systems has allowed a new dimension of available information which makes the role played by the teachers critical to the promotion of meaningful learning experiences (Garrison *et al.*, 2003).

2.3.9 Community of Inquiry

Garrison, *et al.* (2003) explore the theory of critical inquiry applied to online distance education, and notes that the distinguishing feature of online learning in the 21st century is that regardless of time and space, students can develop a critical community of inquiry. Anderson (2008) identifies three aspects which need to be present to incorporate an effective community of inquiry model which include cognitive presence, social presence and teacher presence. Garrison (2000 in Garrison *et al.*, 2003) proposes these three critical elements as a fundamental framework of the community of inquiry model as illustrated in Figure 2.12.

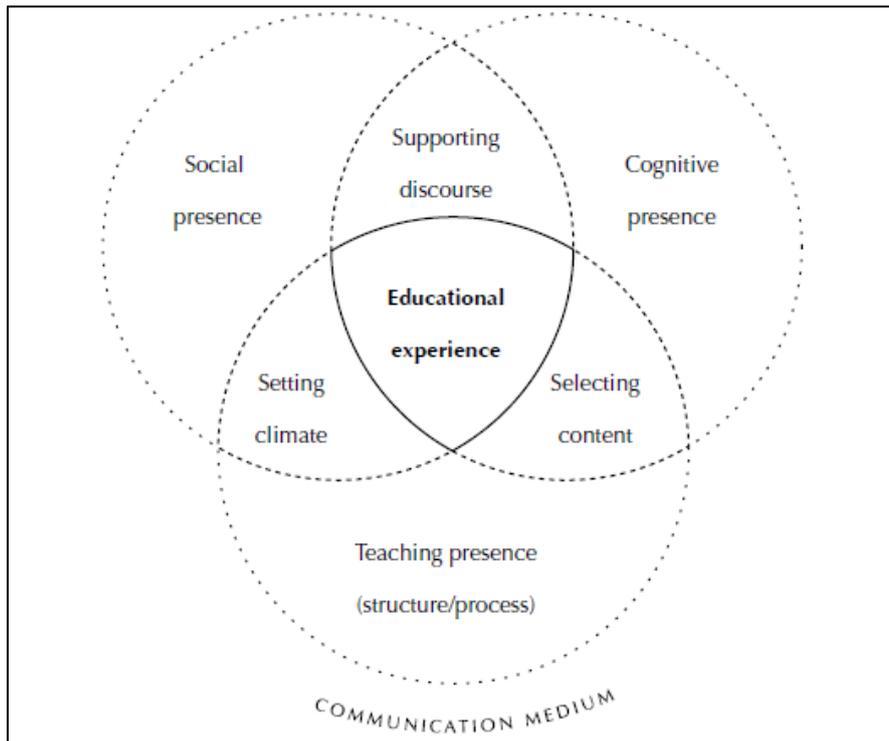


Figure 2.12: Elements of an educational experience (Source, Garrison *et al.*, 2003 in Anderson, 2008:223)

- a) Cognitive presence: The cognitive presence is defined as “the extent to which students are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry” (Garrison *et al.*, 2003:115). This presence includes four aspects of the student experience which adds to the cognitive presence, namely deliberation, conception, action and perception. Anderson (2008) proposes that the cognitive presence stimulates critical thinking in students during the learning process.
- b) Social presence: Within the model of community of inquiry, Garrison *et al.* (2003) define social presence as the interactions and contributions between students within the learning community. Anderson (2008) adds to this notion and states that the social presence supports the learning environment by enhancing the involvement of students. Social presence connects directly with student satisfaction and higher results (Anderson, 2008).
- c) Teaching presence: The teaching presence includes factors of the module outcomes, strategies, instructional design and student characteristics, which are also dependant on the technology applied in distance education (Garrison *et al.*, 2003). Anderson (2008) emphasises that a large part of building teaching presence is by defining clear objectives and conducting thorough planning of content and deadline guidelines as well as

building discourse and allowing for thorough reasoning of opinions which assist students in the learning process.

In online learning, the opportunity exists for more flexible methods of learning in which the community of inquiry makes use of synchronous or asynchronous methods to facilitate virtual classrooms via conferencing (Anderson, 2008).

2.3.10 Summary

From the nine pedagogical principles elaborated on in Sections 2.3.1 to 2.3.9, it is evident that each of these theories in some way are applicable and still used in online distance education in the 21st century. Many principles within these theories are applied in curriculum design and learning management systems (LMS). A summary of the principles of teaching and learning and the application of each pedagogical theory discussed in the above sections, is illustrated in Table 2.1.

Table 2.1: Summary of reviewed pedagogical theories

Pedagogical theory	Principles	Learning systems	Teaching systems	Application in 21st century
Cognitive-behaviourism	Learning occurs through a change in behaviour. Knowledge is actively constructed by students in their current environment	Individual learning by repetition of actions with measurable outcomes	Stages of learning with clear objectives set at the beginning	Google docs, wikis, dropbox, mass media, one-one and one-to-many communication platforms
Theory of industrialisation	Education is compared to industrialisation; materials are standardised, produced and shared	Autonomous learning	Developing and preparing instructional material as part of a system	Learning materials shared on online sources to be downloaded with students, e.g., dropbox
Theory of independent study	Student and teacher are separated, accommodation of student regardless of place or time	Individualised independent study at own pace	Teaching adapted to individual preference, assessments on progress	TV, live videos, web-based recordings, conferencing.

Pedagogical theory	Principles	Learning systems	Teaching systems	Application in 21st century
Constructivist theory	New knowledge is built on the foundation of previous learning	Active learning, collaboration among students in a community	Authentic instructional tasks	Multiple learning formats in Web2.0 using wikis, blogs and social media, conferencing
Theory of guided conversation	Organised learning with 2-way communication between the student and teacher	Conversations facilitate learning using self-instructional materials	Sufficient planning and guiding, building relationships between student and teacher	e-mails, video calls, google chat.
Transactional distance	Transaction between student and teacher based on dialogue and structure	Autonomous learning	Prescribed outcomes and assessments	Timeous and frequents contributions in online platforms
Connectivism	Developing connections between communities of people, practice, and technology	Complex learning in networks, occurs through interpretation.	Managing and rationalising the information obtained.	Not limited to one LMS or uploaded content, use of Web2.0 tools for social networking
Online collaborative theory	Collaboration between student communities to create knowledge.	Student centred and student driven	Collaboration with students to ensure a balance of control in available information	Discussion platforms, asynchronous learning management systems
Community of inquiry	Teaching presence, social presence, and cognitive presence	Synchronous and asynchronous independent learning	Proper planning and facilitation of groups.	Conferencing, collaboration across LMS collaboration tools and videos

2.4 CONCLUSION

The literature review included a summary of nine pedagogical theories which have been applied in online distance learning from the development of distance education to date. The application of these principles in online distance education was also presented in this Chapter. Although many of the pedagogical principles were not necessarily developed with online

learning as the framework and rather focus on the attributes of effective distance education, these principles which form the foundation of each theory, remain relevant.

Student engagement and expectations differ significantly in online and traditional classroom teaching, therefore with the growth of online distance education, teachers need to ensure they can effectively engage and meet the expectations of students online. The requirements for effective online teaching and learning need to be considered when applying relevant pedagogical principles. A summary of the principles, teaching and learning systems and online applications thereof was presented in Table 2.1 of this Chapter. Chapter 3 elaborates on the research design and methods used in this research.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

The objective of the study was to determine which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education. To provide context of applied pedagogy, nine pedagogical theories which are currently applied in online learning have been investigated and elaborated on in Chapter 2 Section 2.3. Chapter 3 offers specific particulars of the applied research methods, design and ethical measures planned for the study. The rationale for the study focuses on the rapid technological progressions in the Fourth Industrial Revolution and establishes a need for a similar progression in guiding pedagogy. The research paradigm and approach which directed the process of qualitative data gathering and analysis is presented. Research methods, limitations and the inclusion criteria for the literature review and document analysis are elaborated on. The ethical considerations and measures pertaining to the conducted research are incorporated within Chapter 3.

3.2 RATIONALE FOR THE RESEARCH STUDY

Xing and Marwala (2017) note that due to the Fourth Industrial Revolution, new forms of interdisciplinary universities are emerging which will make use of simulated classrooms, libraries, technologies and teachers which will not reduce the educational experience but rather enhance it. However, Mezeid (2016) suggests that “in order for higher education to deliver future generations with the right set of skills and knowledge; an imperative question has to be asked regarding how higher education institutes would be affected by the Fourth Industrial Revolution, and how the delivery of education will be transformed.”

The reality within each education system is that technology is rapidly evolving, more readily available and affordable to students and educational institutions. Crawford (2009) proposes that the swift change in technology has increased the accessibility to the internet which in turn has increased the participation of distance education.

Simsonson *et al.* (2008) in considering theory and distance education, suggests that the diversity and information communication technology changes experienced in distance

education have prevented the development of a single pedagogical theory in distance education. Crawford (2009) alludes to the fact that many researchers believe it will be a limiting factor to assign one pedagogical theory to distance education. Crawford (2009) also notes that pedagogical principles provide a necessary foundation to guide effective instructional design to ensure meaningful and effective teaching and learning systems. While a single learning theory may not be available, this study aims to delineate strengths in the application of various pedagogies and principles in online learning, and proposes a guideline to promote effective online teaching and learning in higher education.

3.3 RESEARCH DESIGN

The research design is aimed at creating a link between the research questions and the answers to those questions, by linking the ‘why’ and ‘how’ of the study. A research design incorporates the complete research approach chosen to ensure that the research problem is addressed in a coherent way by including the methods of data collection, measurement and analysis (De Vaus, 2001). The research design aims to stipulate the detailed features of the research paradigm, research approach and research type applied within the study. A qualitative study is presented by making use of interpretivism as a research paradigm. An integrative literature review and document analysis was applied in the study.

3.3.1 Research Paradigm

Kivunja and Kuyini (2017) provide a description of a research paradigm and state that “it is the conceptual lens through which the researcher examines the methodological aspects of their research project to determine the research methods that will be used and how the data will be analysed” (Kivunja & Kuyini, 2017:26). Rehman and Alharthi (2016) and Kivunja and Kuyini (2017) suggest that a research paradigm provides a theoretical outline to understand and study reality while considering the four factors of ontology, epistemology, methodology and axiology. Each of these factors can further be elaborated on as part of the research paradigm.

Kivunja and Kuyini (2017) propose that the ontology covers the nature of beliefs and assumptions of what is perceived as reality and therefore aids in deriving meaning of the gathered information. Kamal (2019) describes the epistemology in a research paradigm as the process or relationship by which the researcher determines and acquires the knowledge of

subject matter while Kivunja and Kuyini (2017) suggest that the epistemology defines how an individual derives knowledge about something. The chosen methods in a research paradigm directs the scholar to what type of information or data is relevant and which collection methods will be best applied to study the relevant topic. The axiology of research provides the criteria for which research can be validated by considering credibility, dependability, confirmability and transferability.

Three main research paradigms exist, namely positivism, interpretivism and critical theory. According to Rehman and Alharthi (2016), the positivist paradigm makes use of investigations and experimentations mainly in quantitative data which apply cause and effect logic to understand the social setting. Interpretivists accept that more than one reality exists and that this reality is subjective to the individual who recognises the social climate. Critical theory assumes that the reality which exists has been influenced and determined by external factors and therefore once reality is understood, it is reformed (Rehman & Alharthi, 2016).

3.3.2 Interpretivism as a Research Paradigm

Rehman and Alharthi (2016) state that the aim of interpretive research is to understand the explanations and interpretations of entities and the environments with which they interact, and they therefore propose that interpretivism epistemology is subjective. According to Pham (2018), when applying an interpretivist paradigm, the approach to ontology is relative as the researcher can gain a more complex understanding of the subject, instead of generalising through the subject by trying to understand the whole population. Interpretivism is therefore chosen as the research paradigm for the study, as it allows the researcher to gain an understanding and interpret the settings in which pedagogical principles are applied in online and distance learning in higher education. By using interpretivism, I was able to make use of the subjective experiences in online teaching and learning which have been researched and published. Through understanding and restructuring the content I am able to use these experiences and practices as content in building blocks to guide my research in proposing applicable theories to be used in online learning.

3.3.3 Research Approach

The research approach was qualitative by nature. Qualitative research, according to Marczyk, DeMatteo and Festinger (2005), includes studies which do not aim to quantify results by means of numerical summary or analysis, but rather include observations and in-depth reviews of the subject matter. Kamal (2019) similarly notes that qualitative research identifies how individuals define and perceive their experiences. The aim of the qualitative approach is to understand the online teaching and learning experiences which are effectively documented in published sources.

Merriam and Tisdell (2016 in Kamal, 2019) provide four characteristics of qualitative research. Firstly, the purpose of the research is typically to understand experiences or perceptions of individuals or a group. Secondly, the researcher is the primary collector and analyser of data. Thirdly, the data will form part of a concept, hypothesis or theory and fourthly, the explanation was derived from multiple data sources. These characteristics are elaborated on in the chosen research methods in Section 3.4.

Phenomenology aims to apply the conscious ability to think, and in so doing, highlights the individual's experience, therefore when applied to research, phenomenology aims to alter the experiences into data (Koopman, 2015). Therefore, by applying phenomenology in this study, the researcher is able to categorise the experiences of individuals depicted in literature and synthesise these findings. Koopman (2015) states that when applying phenomenology, experience and behaviours are interdependent and therefore it offers a description of the experience. Within this approach, the material consulted will allow the researcher to understand the experiences of teachers and students while applying specific pedagogical principles. Research was in the form of an integrative literature review as well as a document analysis.

3.4 RESEARCH METHODS

According to Symeou and Lamprianou (2008), the research methods denote how the research design is organised in rational and dependable actions in order to reach effective and trustworthy conclusions. The study makes use of qualitative methods from secondary sources in order to address the research questions. The process of data accumulation and processing is described in this Section.

3.4.1 Data Collection

The student is the primary collector of data and makes use of secondary data sources. Secondary data sources include studies and sources which have already been accumulated by someone else and are accessible to the public by means of published work (Parveen & Showkat, 2017). The data used within the study makes use of an integrative literature review and document analysis.

3.4.1.1 Integrative literature review

According to Snyder (2019), an integrative review aims to “assess, critique, and synthesize the literature on a research topic in a way that enables new theoretical frameworks and perspectives to emerge” (Snyder, 2019:335). The process of conducting the integrative literature review will follow the six steps developed by de Souza, da Silva and de Carvalho (2010). These steps include formulation of the guiding question, sampling the literature, collecting data, analysing data, discussing results and presenting the integrative review. I have chosen the use of an integrative review for the study as it allows for a broad methodology to be incorporated, which according to Wittemore and Knafl (2005), permits for experimental and non-experimental research to be included within the study. The results therefore can cover the research topic in full, in order to contribute to new recommendations pertaining to pedagogical theories in distance education. “Integrative reviews incorporate a wide range of purposes: to define concepts, to review theories, to review evidence, and to analyse methodological issues of a particular topic” (Broome, 1993 in Wittemore & Knafl, 2005:547). The criteria applied for inclusion of literature for the integrated review are included in Section 3.4.1.2.

3.4.1.2 Inclusion Criteria for the Integrative Literature Review

An integrative literature review has been conducted on data from multiple secondary sources. The criteria for inclusion of documentary material were based on the literature, and academic articles relating to educational policies and teaching methodologies, which assess the effectiveness of applied educational theories in distance education. Five categories were used in the inclusion criteria as presented in Figure 3.1, which resulted in 49 documents being considered in the integrated literature review.

- a) Identification: A literature search from the UNISA library service was conducted to investigate appropriate online learning pedagogy using Web2.0. Pedagogy and online

learning were used as key words. The UNISA library provided the researcher with relevant books, journals and e-journals, periodicals, published printed/electronic sources and published policy documents to review. Published scholarly articles available in the public domain were also utilised and located through Google Scholar.

- b) Screening: Article titles and abstracts were reviewed to ensure relevance of subject matter to the study.
- c) Eligibility: Documents which evaluate distance education settings were included, similarly, documents which are associated with higher education were included.
- d) Study design: Research which included the application of pedagogical theories or the evaluation of effective teaching and learning practices were included.
- e) Date: In publications which are included with previous editions, only the most recent editions were considered.

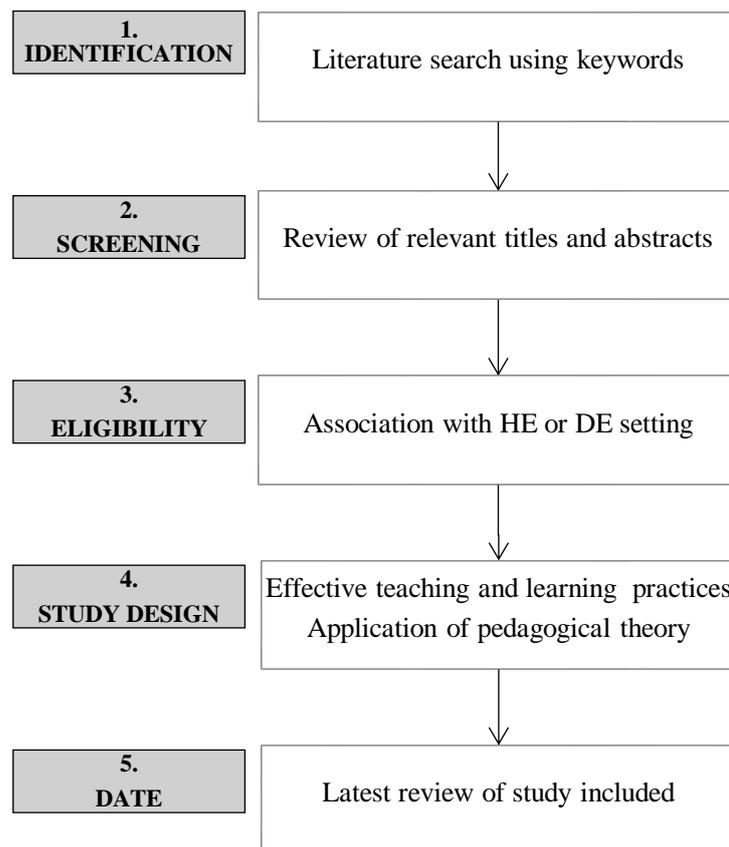


Figure 3.1: Inclusion criteria for documents utilised in the integrative literature review

3.4.1.3 Document analysis

The study aimed to understand the context in which guidelines are provided to facilitate an effective online teaching and learning environment. To focus the study toward institutions offering online education and to contextualise prescribed conditions and frameworks, a document analysis was chosen. According to Bowen (2009), a document analysis in qualitative research entails that data is briefly scrutinised, thoroughly examined and understood to create meaning and understanding of the subject matter.

A document analysis was included on teaching and learning policy documents of four South African comprehensive universities which offer online education on a national qualification framework (NQF) level 7 and above. According to the Department of Higher Education and Training (2020), a level 7 NQF qualification in higher education includes a Bachelor's Degree or Advanced Diploma. This document analysis is included to provide reference as to what guidelines are currently being deployed by universities offering distance education.

The inclusion and exclusion criteria for documents in the document analysis is depicted in Section 3.4.1.4. The document analysis aims to provide an in-depth investigation of the higher education institutions' policy documents on teaching and learning. A document analysis was used to evaluate the institutions based on aspects which analyse the process outlined per institution with regards to proposed pedagogy, principles of teaching, principles of learning and the applied learning management systems.

3.4.1.4 Inclusion Criteria for Document Analysis

University policy documents used in the document analysis were subjected to more rigid inclusion criteria as they assess a specific component within the current setting in South African universities offering distance education. Inclusion criteria, as presented in Figure 3.2, for the document analysis were based on the following concepts:

- a) Geographic location of the higher education institution: Only institutions within the geographical boundary of South Africa were included.
- b) Classification: Universities recognised by the South African Council of Higher Education (2012) as per the Higher Education and Training Laws Amendment Act 23 of 2012, were included.

- c) Online learning availability: Of these universities, institutions offering full time distance education via online platforms, were considered.
- d) Level of qualification: If the level of the full-time distance qualifications equates to an NQF level 7 and above, the institution was included.
- e) Availability: Documents of the included institutions needed to be available in the public domain.

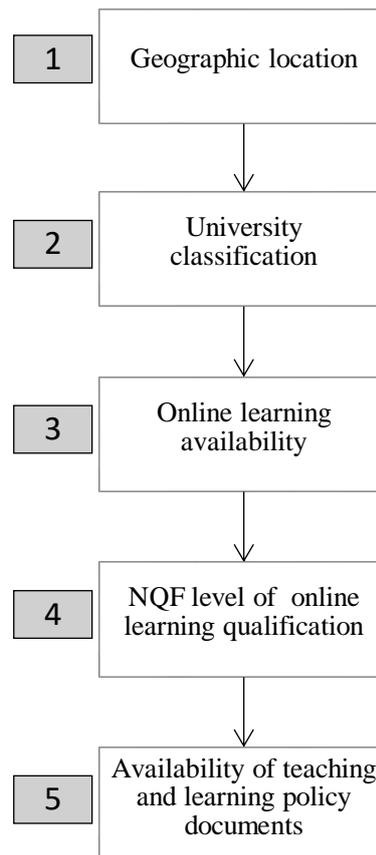


Figure 3.2: Inclusion criteria used in document analysis

3.4.2 Research Limitations and Delimitations

This research was limited to the following local socio-economic aspects and global current events.

3.4.2.1 Access to information communication technology

The effectiveness of online learning is dependent on the accessibility and ability to process information via technological aspects and access to the internet (Abell *et al.*, 2016). The study

did not include the challenges that various socio-economic areas within South Africa experience regarding accessibility to the internet or to devices to provide information or learning material in distance education. Research is done under the assumption that students and faculties have access to relevant hardware and software.

3.4.2.2 Distance education due to the Covid-19 virus

Due to the global Covid-19 pandemic and the various stages of governments imposing lockdown regulations, the United Nations (2020) reported that education on all levels has needed to make use of ICT to deliver online distance learning, with 80-85% education continuing in developed countries and 50% in low-income countries. This research did not consider guidelines or publications based on distance education as a result of Covid-19. Only literature and policy documents based on existing online teaching and learning prior to the current distance learning arrangements were considered.

3.4.3 Data Analysis and Processing

According to Hancock, Ockleford and Windridge (2007), the analysis of data includes summarising accumulated data and providing a result to illustrate the important aspects. Marczyk *et al.* (2005) promote three important aspects to ensure that the data analysis process's validity and integrity is not compromised. These three aspects include preparing the data for analysis, analysing the data and interpreting the data.

3.4.3.1 Preparing data for analysis

I located and gathered the relevant documentation or e-resources as per Section 3.4.1. Documents were re-named and saved in electronic format in relevant folders based on the content. All documents used throughout the study were stored electronically on my personal drive and online via Dropbox and Google drive to ensure a backup of the documentation.

3.4.3.2 Analysing the data

I ensured that all documents were relevant and applicable to the study and only considered published documents in peer reviewed journals or books which analyse the effectiveness of applied pedagogy on online learning. The authenticity of the documents is validated by ensuring all publishing information and authors were included in the citations and reference

list. I recognised that bias might have existed within the authors of the documents and therefore I analysed the document significance and pertinence within the study. Chowdhury (2015) proposes that the process of crystallisation or inter-textuality can be applied to validate data in qualitative research and suggests that the legitimacy of text or data is confirmed by various sources covering the same subject matter. Data were scrutinised using content analysis, which according to Bengtsson (2016), offered supported in categorising and deriving meaning from the data in order to summarise and present a representative conclusion. The content analysis identified articles with themes associated with effective distance education in a higher education environment. Categories were formed by grouping pedagogical theories according to the three generations discussed in Chapter 1 Section 1.2.3 as well as the effectivity of online teaching and learning practices.

3.4.3.3 Interpreting the data

An in-depth analysis of each document was carried out, keywords and common themes were searched to ensure that the relevant aspects of the documents were incorporated within the study. To find a relationship between the investigation within the document analysis and the applications in current online learning environments, I aimed to understand the context in which guidelines were provided to facilitate an effective online teaching and learning environment. To focus the study toward institutions offering online education and to contextualise prescribed conditions and frameworks, document analysis was chosen.

The data were used to evaluate the institutions based on aspects which analyse the process outlined per institution with regards to proposed pedagogy, principles of teaching, principles of learning and the applied learning management systems. Each institution was individually examined and formed part of the holistic view to determine which pedagogical frameworks and learning management systems are being used to support online distance education in South Africa.

3.5 TRUSTWORTHINESS

Lincoln and Guba (1985) outline four ideologies to be considered to ensure trustworthiness in qualitative research. These include credibility, dependability, transferability and confirmability. Chowdhury (2015) suggests that in addition to the four steps suggested by Lincoln and Guba (1985), that the quality in qualitative research is dependent on multiple steps which also include data collection techniques, data analysis, triangulation or crystallisation and

ethics. The characteristics of data collection, analysis, crystallisation and ethics pertaining to this study, are elaborated on in Sections 3.4.1, 3.4.3 and 3.6. Aspects of credibility, dependability, transferability and confirmability pertaining to this research are discussed below.

3.5.1 Credibility

Chowdhury (2015) refers to credibility as the truth-value in which the researcher adopts and applies appropriate research methods, which are clearly defined to ensure internal validity. In Section 3.4, I included detailed description of research methods, inclusion and exclusion criteria, data collection and processing to ensure that the findings were consistent to the e-learning reality.

3.5.2 Transferability

The transferability of a study refers to the level in which the results can be utilised in other studies and circumstances to potentially produce alike conclusions (Shenton, 2004). Shenton (2004) recommends that an understanding of the data is developed through numerous studies. To ensure transferability, the researcher confirms that various secondary sources are considered throughout the integrative literature review and in the document analysis.

3.5.3 Dependability

Dependability of qualitative research, according to Lincoln and Guba (1985 in Korstjens and Moser, 2018) is “transparently describing the research steps taken from the start of a research project to the development and reporting of the findings” (Korstjens & Moser, 2018:121). To ensure dependability, I ensured that a systematic process is followed in the research design to record the research steps, which ensure consistency throughout the study.

3.5.4 Confirmability

Confirmability relates to the extent to which the findings are derived from the data and can be confirmed by additional researchers as such and not the opinion or bias of the researcher (Shenton, 2004). Throughout the research process, I recognised that personal bias and opinions exist and therefore included a detailed description of the research methods that were followed, as well as opinions and bias that were noted and documented throughout the study.

3.6 ETHICAL MEASURES

All research and findings are aligned with the guideline for ethical research as per the UNISA policy on research ethics (UNISA, 2016). I received guidance from my academic supervisor and have obtained consent from the UNISA Ethics committee to conduct the study (Appendix A). According to UNISA (2016), the ethical review is “an objective appraisal of the effect of the proposed research on the wellbeing of potential participants, animals, the environment, institutions, collectivises and communities by an established Ethics Review Committee” (UNISA, 2016:2).

The research made use of a document analysis and policy documents available in the public domain and no individual participants were directly involved; therefore, the risk category of the research is negligible. As per the UNISA policy on research ethics (UNISA, 2016), the privacy of the specific academic institutions was protected. A complete list of references is included at the end of the research document which includes all sources consulted. In addition, all documents pertaining to the study will be stored for five years from the date of final submission of the research.

3.7 CONCLUSION

The research design and methods include aspects which elaborate on the rationale for the research to provide the reader with the evidence that the application of online learning is increasing without an equivalent increase and development of guiding pedagogical principles. The research design provides a background to the interpretivist research paradigm within a qualitative research approach. An integrative literature review and document analysis was chosen as the research type. The research methods presented created an understanding of the inclusion and exclusion criteria as well as the procedures followed for data accumulation, analysis and interpretation. The trustworthiness of the research is summarised in four categories of credibility, dependability, transferability and confirmability, and the ethical measures relating to the research was also provided. Chapter four presents a synthesis and summary of the reviewed literature for the nine pedagogical principles and requirements for effective online learning and teaching. A document analysis of four South African universities was conducted to consider current pedagogy within online teaching guidelines as well as to investigate the design of the online courses and the applied learning management systems.

CHAPTER 4

DATA SYNTHESIS AND SUMMARY OF RESULTS

4.1 INTRODUCTION

Chapter three provided the foundation and framework on which the integrative literature review and document analysis is discussed. Chapter four aims to synthesise and summarise the nine pedagogical theories presented in Section 2.3 within the requirements for effective online teaching and learning presented in Sections 2.2.1 and 2.2.2 respectively. This synthesis assisted in addressing the main research question: *Which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education?* Chapter 4 also provides a document analysis which evaluated the content of proposed teaching and learning policy documents of four South African universities who offer online distance education.

4.2 RESEARCH FINDINGS FROM THE INTEGRATIVE LITERATURE REVIEW

By using the integrative literature study presented in Chapter 2 as a background, research objectives are addressed by applying the requirements for effective online teaching and learning as themes to categorise the pedagogical principles. The synthesis provides applicable pedagogical principles from theories which can be applied in each category of effective online teaching which include: student faculty contact, collaborative learning, active learning, prompt feedback, time on task, high expectations, diversified learning and application of technology (See Chapter 2, Section 2.2.1). The application of pedagogical principles which apply to each teaching requirement aid in providing information to address the sub-question in section 1.4 of: *Which theories best support a learning environment when using Web2.0 technology in distance education?* The objective therefore was to evaluate theories which best support teaching and knowledge sharing by teachers when using Web2.0 in distance education. Similarly, the objective to assess existing theories which best involve, support, and communicate with students online was managed by categorising pedagogical frameworks which aid in effective online learning through student motivation, feedback, social interaction, learning preferences and technology. This will support the formulation of answering the sub

question: *Which theories best support a teaching environment when using Web2.0 in distance education?* Maganga and Ssenkusu (2019) suggest that teachers mainly focus on producing students who are academically compliant and therefore focus their teaching methods on a more teacher-centred approach. Students are not encouraged to develop critical thinking and problem-solving skills. To ensure online teaching is effective, an approach towards a more student-centred learning environment is necessary which, in turn will form a teaching method which intensifies student engagement (Rayens & Ellis, 2018). The aspects of student and teacher centred approaches are also included in the synthesis of effective teaching and learning requirements.

4.3 THEMES FOR EFFECTIVE ONLINE TEACHING

The work conducted by Chickering and Gamson (1987), Bangert (2004) and Cable and Cheung (2017) provide eight principles on which effective online teaching is dependant (Chapter 2 Section 2.2.1). Each of these principles is discussed with relevant pedagogical background that supports the application of the necessary conditions for effective online teaching. The researcher relied on literature to guide the process of identifying themes used in the data synthesis. The principles of effective online teaching have therefore been used as themes to categorise information in the data synthesis of the integrative review. These themes for effective teaching include student faculty contact, collaborative learning, active learning, prompt feedback, time on task, high expectations, diversified learning and application of technology. The discussions of each of these themes within this Section aims to answer the sub-question in section 1.4 of: *Which theories best support a teaching environment when using Web2.0 technology in distance education?*

4.3.1 Theme 1: Student Faculty Contact

Holmberg (2005) suggests that when contact is established and students perceive a personal interest or connection to the teacher, the motivation of the student is also increased. Several principles from pedagogical theories can be applied to assist with increasing student faculty contact and subsequently the motivation of the student. In the application of the theory of industrialisation, Peters (2010) discusses the principles of centralisation and concentration of staff (Chapter 2 Section 2.3.2). Ensuring that administrative staff and teaching staff are centrally located, means that they will be able to focus on their respective tasks which will

assist with more time for effective and relevant one-to-many or one-to-one communication between the faculty and the student. This is effective for managerial and teaching staff to be able to easily communicate with one or many students simultaneously. Similarly, in industrialised teaching, the principle of mechanisation, articulated by Schlosser and Simonson (2002) and Peters (2010), will enhance communication by applying the correct media and technologies in the administrative and learning process.

The theory of guided conversation developed by Holmberg (1983) and discussed in Chapter 2 Section 2.3.5, increases dialogue between the academic staff and the student which increases the amount of student faculty contact. Keegan (2013) suggests that the dialogue within the theory of guided conversation can be either simulated by means of conversational text, pre-recorded material or tangible conversation by means of two-way correspondence via e-mail or telephone. Each guided conversation between the teacher and student creates a personal connection and increases the student faculty contact which in turn, as Keegan (2013) suggests, increases student motivation. The importance of communication technologies between the faculty and the student is proposed as one of the most important components leading to successful distance education as all guidance and feedback to the student is dependent on this communication.

4.3.2 Theme 2: Collaborative Learning

Collaborative learning is an approach used in teaching and learning which makes use of groupwork amongst students to positively assist in the process of learning (Johnson & Johnson, 1999). Collaborative learning is aimed at increasing student-student interaction to establish a community in which students can share their learning experiences. According to Ware (2006), construction of knowledge is an important cognitive and metacognitive factor in student-centred learning where students can link new information with existing information. The principles of the online collaborative theory derived by Harasim (2017) and elaborated on in Chapter 2 Section 2.3.8, support collaborative learning in the three core principles through idea generation, organising and academic convergence. The online collaborative theory supports an environment in which students can include their experiences and ideas within a community to brainstorm new approaches to understand the content. The role of the teacher is to assist groups through collaboration to organise this information and by allowing students to summarise and package the content to create a meaningful learning experience. Bates (2019) emphasises the

importance of quality communication processes to ensure effective communication between teachers and student and student groups.

In creating collaborative groups and allowing students to be part of a community of learning, the principles within the theory of community of inquiry are also applicable in ensuring collaboration in distance education. Garrison (2003) suggests that social presence amongst students needs to be coupled with a cognitive presence as well as teacher presence (*cf.* Chapter 2 Section 2.3.9). These three aspects of social, cognitive and student presence are important to ensure that the educational experience and critical thinking is supported with the role of the teacher being to ensure that the correct content is discussed through meaningful conversations in a safe environment for students to share their ideas and experiences.

4.3.3 Theme 3: Active Learning

Bates (2019) proposes that active learning empowers students to understand the content presented in order to apply the fundamentals thereof. Active learning therefore is being able to apply autonomous learning and practically apply the work to a specific environment and not cite the answers theoretically. The contrary thereof is deliberated by Rayens and Ellis (2018) who discuss teacher-centred approaches and mention that students have become dependent on teachers to deliver content which subsequently leads to passive learning. A teaching approach towards a student-centred environment is therefore essential to ensure active learning.

When applying constructivist pedagogical principles, students are encouraged to derive personal meaning from the content as viewed from their individual perspectives (Jonassen, Davidson, Collins, Campbell & Bannan Haag, 1995). Students need to articulate personal views on the content through the application of the taught content. Duc (2012) mentions three aspects in the constructivist approach which include student analysis to ensure students derive meaning from the content, course design and distribution of content by the institution and evaluation methods which assess individual solutions rather than one answer to each problem. To apply and develop content for students within these three aspects to distance education could seem labour intensive for any institution as evaluations of various answers and application in specialised areas could require a more in-depth evaluations and feedback. This challenge can be addressed by incorporating the principle of division of labour derived by Peters (1967) within the theory of industrialisation. The theory of industrialisation, as discussed in Chapter 2 Section 2.3.2, allows students to be self-governing in their learning and by making

use of the division of labour of specialists in the field of study, adequate course design and evaluation by various individual academic staff members. By dividing specialists' resources, quality can be upheld by ensuring students have access to specialist teachers or tutors for each individual task where content can be applied and which therefore promotes active learning.

4.3.4 Theme 4: Prompt Feedback

Providing feedback to students is essential for successful distance education (Holmberg 2005). When discussing the theory of guided conversation, Holmberg (2005) also mentions that giving students feedback is important for them to ascertain whether or not their learning methods are adequate. Feedback assists student in correcting their errors and ensures that time and energy spent on studying is effectively applied. By applying the theory of guided conversation, as discussed in Chapter 2 Section 2.3.5, the teacher will be directing the students' progress with regards to the application of the learning content to relevant tasks and activities. This implies that prompt feedback is necessary throughout the learning journey. Should submissions from students receive prompt reactions, students will be able to build on the feedback ensuring that the thought process become more fully developed. Teachers need to ensure that in planning the module content, sufficient time is given to allow for the provision of feedback. The division of labour, derived from the theory of industrialisation by Peters (1967), can be applied to ensure that tutors and various support or teaching staff can assist in providing student feedback which is timeous, positive and constructive to indicate to students where they can build and focus their knowledge. Prompt feedback requires a more labour-intensive approach from academic staff which needs to be taken into consideration early in the development and planning of the curriculum.

4.3.5 Theme 5: Time on Task

The factor which makes online learning appealing to many individuals across the globe is that it can be completed in your own space and own time. However, since this notion fully supports student autonomy and a student-centred environment, the curriculum also needs to provide guidelines to the students on how much time is necessary per task. The role of the teacher is to ensure that students understand how much time should be spent on each task and module. Clearly defined submission timelines allow students to be empowered to use their own time freely, and to know what is expected of them to achieve academic success. In the theory of industrialisation, developed by Peters (1967), he discusses eight essential phases for effective

industrialisation of distance education and proposes that correct and intensive planning is essential to include in teaching materials. Similarly, in applying the principle of preparatory work, described by Peters (2010), this will assist facilities in creating a realistic time on task agenda to ensure students know upfront how much time is allocated for each action. In a similar fashion, this allows teachers enough time to plan the teaching process and time allocation for evaluation of materials (Schlosser & Simonson, 2002).

4.3.6 Theme 6: High Expectations

Niari, Manousou & Lionarakis (2016) discuss the Pygmalion effect as a self-fulfilling prophecy where increased expectations from academic staff to students, generally lead to higher academic performance from students. Expectations for students can be divided into positive or negative expectations, directed at individuals or groups of students regarding learning characteristics within one module or to the full curriculum (Niari *et al.*, 2016). Kain (2018) expresses the importance of aligning the pedagogical strategies with the practical methods of teaching, to ensure that expectations are clearly communicated to the students especially in a student-centred environment which could lead to confused students who may be pursuing wrong ideas. In including individual differences in student centred learning, Ware (2006) discusses the notion that an essential component of the learning process is setting appropriate and high expectations to continuously assess the students' progress. The role of the teacher in applying this characteristic is to ensure that clear communication on expectations is articulated. Building on these expectations, the principle of motivation by reward can be applied from behaviourism where students are motivated by their performance (Chapter 2 Section 2.3.1). Skinner (1976) deliberated that repetitive actions and activities with positive re-enforcement eventually leads to a change in behaviour.

Together with having higher expectations, Niari *et al.* (2016) stress the importance of the various methods of support to students via distance education and mentions that the communication between the teacher or faculty is of utmost importance to uphold student motivation in reaching expectations. The theory of guided conversation suggests that appropriate guidance can be given to the students through the setting of goals (Holmberg, 2005). Teachers therefore can set goals which articulate high expectations from student performance throughout the curriculum. These established goals and expectations can then form the foundation on which didactic conversation between the student and teacher take place.

4.3.7 Theme 7: Diversified Learning

The increase in diversity in students participating in online distance education necessitates that institutions need varying methods to deliver content to ensure all students have a positive learning experience (Bates, 2019). Diversity in online learning needs to not only consider various students' socio-economic backgrounds, infrastructure challenges and geographic time zones, but should also include various pedagogical principles and applications to include several learning styles and student preference. "Learning is most effective when differences in learners' linguistic, cultural, and social backgrounds are taken into account" (Ware, 2016:21).

In applying the constructivist theory, as presented in Chapter 2 Section 2.3.4, students are able to develop their own meaning of the content, thereby advising autonomous students who can easily apply the knowledge in their chosen environment (Harasim, 2017). As students apply this knowledge in their environments, they are able to create meaning in a learning style which suits them and therefore inherently supports diversified learning. The principle of analysis of content within constructivist pedagogy alludes to the process where students create their own meaning and build and reflect on this experience which stimulates the learning progression. Similarly, in applying the principles in the theory of guided conversation, as per Chapter 2 Section 2.3.5, students are encouraged to construct knowledge in a community and form their own opinions (Simonson *et al.*, 2008). Keegan (2013) suggests that in applying the theory of guided conversation, students should be able to include and apply personal interests and opinions. Various individual and diversified learning styles are then accommodated as the role of the teachers is to guide the learning process through meaningful conversation and not dictate the learning content and style.

Simonson *et al.* (1999) emphasises that by applying the theory of independent study, that more responsibility is placed on the student throughout their studies. This in turn allows students to apply their own learning style irrespective of the preference or faculty environment. The student is fully autonomous and thus the teacher acts more as respondent than a leader (Simonson *et al.*, 2008). In allowing students to learn through the use of diverse methods which include individual preference, the role of the teacher is to guide the learning process and the meaning created by each student.

4.3.8 Theme 8: Application of Technology

Moore and Anderson (2003) propose that teachers and curriculum designers should be familiar with the applications, advantages and shortfalls of each technology applied in online learning to understand the impact thereof on interacting and sharing content. The application of technology can be viewed as twofold; it firstly aims to benefit the institution through cost-saving methods of distributing learning material and secondly, acts as the medium through which all communication and sharing of learning content is distributed. In ensuring the institution fully utilises the cost-effective strategies for using online platforms and fully automated systems, the principle of division of labour in the theory of industrialisation is applicable. The theory of industrialisation, according to Peters (2010), is relevant in ensuring that the use of technology is aligned with mechanisation and mass production of study material in a more cost-effective manner, where an increase in production units typically ensures a decrease in cost per unit. The use of technology may assist faculties in decreasing teaching costs in producing and distributing study material.

Students need to be fully autonomous in utilising the opportunities which are present in online information, which is freely available (Siemens, 2004). In applying the connectivist theory where learning occurs when students connect various nodes of information sources, the application of technology is essential for this learning to occur. These sources of information, according to Siemens (2004), may be found in non-human applications where specialists upload information and data online which is easily shared and compared to various other results by means of algorithms, which then can display and synthesise concepts. The use of such technology is expected and is necessary to ensure that students remain up to date and use the most current material available. The approach of teachers in choosing the application of technology is to ensure that students make use of relevant data and that the connecting of various information points leads towards a positive learning outcome. The correct application of technology in online and distance education is the ability to break down geographical distance between teachers and students, allow them to instantly share thoughts and progress in becoming fully autonomous and collaborative.

Each one of the aforementioned principles for effective online teaching cannot be fully applied without sufficient information communication technology between the students and the faculty. In online distance education, this is reliant on the application of technology. Many

institutions make use of a fully integrated learning management system through which all course content is shared, students' work is uploaded and feedback is given. However, this is effective only if there is adequate two-way communication.

4.3.9 Summary of themes for effective online teaching

The most important and recurring concept of teaching is effective and continuous communication, the summary of results from the integrated literature review of the pedagogical theories applied to the requirements for effective online teaching are presented in Table 4.1.

Table 4.1: Summary of requirements and applied theories for effective online teaching

Requirement	Description	Theory	Application
Student faculty contact	Personal contact between faculty and students encourages a personal relationship which in turn promotes motivation.	Guided conversation	Guidance from teaching and administrative staff to develop supporting relationships and two-way communication between faculty and student.
		Theory of industrialisation	Centralisation and concentration of resources as well as mechanisation of administrative communication and mechanised sharing of information to increase student faculty contact through one-to-many communication methods
Collaborative learning	Students encouraged to work in groups to promote a feeling of community	Online collaborative learning	Important to establish a community with effective communication methods for students to share experiences to enhance the learning process.
		Community of inquiry	Ensure teacher presence, cognitive presence, social presence to guide the learning process in collaborate groups
Active learning	Students to reflect and apply content to solve problems rather than cite curriculum.	Industrialisation	Allows student to be autonomous, in applying their learning styles to create meaning.
		Constructivist	Students to develop their own meaning through analysis, design and evaluation of content.
Prompt feedback	Prompt feedback provides guidance early in the learning journey and points out development areas for students to focus on.	Guided conversation	Teachers guide the students throughout the curriculum through conversations and feedback to ensure content, application and thought processes are relevant.
		Industrialisation	Division of labour to assist teachers in providing prompt feedback for smaller tasks and evaluations to keep students motivated to spend energy on correct concepts.
Emphasis on time on task	Student autonomy and flexibility of time needs to be coupled with clear time lines for outputs.	Industrialisation	Applying the principle of preparatory work which includes focused and intensive planning of the teaching tasks to ensure execution is precise and efficient. This will allow teachers to plan how much time is needed for teaching, executing, completing and evaluating the task.
High expectations	The Pygmalion effect provides students with the self-fulfilling	Behaviourism	Set clear learning outcomes in the beginning which are built on the notion of expecting high value work which in turn promotes motivation in reaching expectations which then changes behaviour.

Requirement	Description	Theory	Application
	prophecy of achieving high expectations which are set for them.	Guided conversation	Teachers guide the learning process to enhance student motivation and clearly define the expected outcomes
Diversified learning	Incorporating various learning styles to incorporate a more diverse group of student preferences.	Independent study	Students are fully autonomous and therefore can apply their own learning styles and work within their own time and space.
		Constructivist	Allows students to develop own meaning through analysis of information.
		Guided conversation	Teachers to guide the learning process and methodology chosen and developed by the students.
Technology application	Use of effective ICT interface for teaching processes and engagements	Industrialisation	Principle of mechanisation and mass production and distribution of cheaper study material.
		Connectivism	Connecting of relevant nodes of information through non-human sources in the internet which stimulate learning experience.
		Independent study	Barriers in geographic location and time zones no longer exist due to technology, therefore students can work independently from the institution.

4.4 THEMES FOR EFFECTIVE ONLINE LEARNING

Abell *et al.* (2016) provided five principles as a framework for effective online learning (see Chapter 2 Section 2.2.2). The application of the pedagogical theories within the five themes of effective online learning include student motivation, student feedback, social interaction, learning preference and the application of technology and are summarised below to support the formulation of answering the sub question: *Which theories best support a learning environment when using Web2.0 in distance education?*

4.4.1 Theme 1: Student Motivation

Student motivation is defined as “a driving force that encourages an action or behaviour to occur” (Diedrich, 2010:6). Regardless of geographic location, media used, or barriers existing in distance education, the success of a student is ultimately dependant on the motivation of the student (Anderson, 2008; Bates, 2019; Holmberg, 2005).

Skinner (1976) in defining the principles which form the foundation of behaviourism, states that a hindrance to student drive and motivation in education was the fear of failure, but positive re-enforcement or instant rewards is followed by a positive outcome. The principles of behaviourism, as articulated in Chapter 2 Section 2.3.1, propose that effective learning takes place in conjunction with an alteration in behaviour. If the behaviour is driven by reward, it is expected that the same behaviour will occur in the future. Skinner (1976) proposes that

behaviour is driven by external environments and therefore events controlled by the teacher can influence behaviour and subsequently motivation of students. In applying the principles of behaviourism to ensure student motivation, a large responsibility is placed on the teacher to ensure motivation, which may create a student who is dependent on the faculty or teacher (Keegan, 2013). Teaching methods therefore may be more directed towards a teacher-centred environment. A balance needs to exist in using motivation by reward by means of reaching certain goals and objectives and allowing for the inclusion of student preference and student autonomy.

The theme of student motivation is repeated in many of the requirements for effective teaching and learning, as most of the effective teaching and learning principles act as tools to promote student motivation, which ultimately leads to the success of the student. The most prominent method in teaching effectiveness applied to motivate students is through the encouragement of effective communication and guidance between the teacher and student. This application is evident in the theory of guided conversation where Holmberg (2005) suggests that students need to be guided through conversations based on the content. This interaction and guidance, according to Keegan (2013), facilitates learning and builds a relationship which in turn promotes student motivation.

4.4.2 Theme 2: Student Feedback

Students who receive feedback have a more positive perception of their learning experience and thus know where to focus their attention in the learning process. According to Savvidou (2018), effective feedback should allow the student to reflect on their efforts and should encourage critical thinking. Teachers can provide feedback by means of guided conversation in which the teacher will directly communicate with the student to provide clarity on the current performance and provide direction and focus on improvement areas. Keegan (2013) elaborates on the theory of guided conversation and states that it motivates students to achieve their goals by means of real didactic conversation or simulated conversational styles used by the teacher to promote learning in the correct form. Even if students are self-directed within their studies, they should receive timely feedback on the content and quality of the activities (Moore, 2018). According to Moore (2018), as this dialogue between the student and the teacher in continuous and constructive feedback is increased, the perceived transactional distance is decreased. The amount of structure and dialogue given by the teacher can change as required, since more

structure and less dialogue lead to increased transactional distance. The amount of dialogue therefore needs to be controlled by the teacher to ensure that an effective learning process is achieved by the student.

Similarly, when applying the connectivist theory, as outlined in Chapter 2 Section 2.3.7, the role of the teacher is to ensure that feedback is given to students to confirm content retrieved by the student through the connecting of nodes of information is relevant and that unnecessary data is filtered out. A connectivist approach allows students to instantaneously share thoughts and ideas and thus information available to the students through collaboration may not necessarily be relevant, therefore the teacher needs to guide the content, which is additionally sourced by the student, as well as the learning process. This can be done through specific feedback which guides the student or collaborative groups through informative tutoring and in doing so, increases social interaction in between students and teachers.

4.4.3 Theme 3: Social Interaction

Baath (1986 in Holmberg 2005) promotes social interaction in distance education and states that meaningful feedback from the teacher, student motivation and student to student interaction promotes social interaction and the learning process as a whole. Homborg (2005) mentions that student contact, and being part of a community through interaction, is more likely to lead to higher marks in student evaluations. Similarly, in a student-centred approach, Ware (2006) advocates that learning is positively affected by interactive relationships and communication with other students and teachers. The application of student interaction is twofold as it firstly allows students to form part of a community which encourages students to collaborate and construct their own meaning thereby enhancing the learning experiences and secondly, the development of a community allows the student to feel supported which thus promotes student motivation.

In a constructivist approach, students are able to learn by analysing and reflecting on the knowledge and learning content shared, and then by evaluating the application continuously to potentially derive more than one solution to a problem. Likewise, the theory of connectivism allows students to be part of a community in which learning is facilitated by the teacher (*cf.* Chapter 2 Section 2.3.7). In the application of the connectivist model, students make use of networks to build knowledge. Siemens (2004) discusses the theory of connectivism as the

ability to nurture and maintain connections in which students need to be encouraged to foster relationships and networks built up through applying connectivism as a learning style. Students are able to connect via social networks and social media, blogs and chat groups to share information without it being in a formal setting where a large amount of time is needed to upload content. Communities easily form with the growth of communicative technologies and the role of the teacher is to adopt these methods and encourage learning through the connection of various nodes of information.

The community of inquiry model, according to Garrison (2003), allows students to become connected and form part of a community (*cf.* Chapter 2 Section 2.3.9). Connections need to be structured and a teacher needs to develop a process to ensure that there is a teaching presence in which the students are able to contribute to the social and cognitive presence. This can take place in groups and blogs, in social media rooms where continuous conversations take place to stimulate all three aspects to provide a positive educational presence. While students make use of social interaction to assist in the learning process and to feel part of a community, they are still able to apply their individual learning style throughout their journey.

4.4.4 Theme 4: Learning Preferences

Ware (2006) discusses developmental and social factors in student-centred learning and notes that “learning is most effective when differential development within and across physical, intellectual, emotional, and social domains is taken into account” (Ware, 2006:22). Wedemeyer (1971 in Keegan, 2013) describes the application of the theory of independent study and mentions that it is especially useful in applications in distance education where students are not dependent on the faculty or teacher but are enabled and guided by teachers who accommodate them to learn in a setting which may be different to that of the school. This includes accommodation of students in different geographic and time settings who are guided by teachers to allow students the freedom to learn and determine their own pace. Simonson *et al.* (1999) discuss the theory of independent study and also note that one element to consider is the way in which it incorporates the individual learning styles and preferences. The structure of the material therefore should be more open to the needs and student preferences in a student-centred environment. In applying learning preferences, Anderson and Dron (2011) note that the quality and effectiveness of the learning journey needs to continuously be improved to ensure that student’s freedom, preferences and control are considered, which is of utmost

importance in 21st century distance education. Therefore, to consider the various dynamics which exist in the student demographics in online learning, the students learning preference is imperative to ensure a successful learning process and to increase student retention.

4.4.5 Theme 5: Technology

Moore (2018) proposes that the application of technology in distance education infuses the teaching and learning process with digital learning tools which expands course offerings, experiences and learning materials. However, Bates (2019) notes that the application of technology and the delivery of content should be focused on the accessibility, flexibility and learning process of the student.

Wolcott (2003) presents four beliefs which should exist when faculties make use of technology, these include that the technology must be in line with a high learning experience, that technology needs to address student needs, that teaching staff are able to deliver the content via technology without assistance and that the use of technology is advantageous to both students and the faculty. Technology has made it possible to support independent study in that resources are available any time and that one-on-one communication platforms are more readily and instantly available. The faculty needs to consider the ease of use and accessibility by students in a multimedia approach rather than one method of sharing content and communicating with students. The chosen learning management system and the application thereof on various devices is important to ensure that if students do have access, they are able to connect and collaborate with the faculty and students. Rayens and Ellis (2018) demonstrate that the motivation and concentration of students is significantly higher in multimedia and video-based content versus the same content produced in text, and conclude by stating that technology, innovative online formants and the correct application of technology has the potential to increase student motivation and in turn reduce the dropout rate of students.

4.4.6 Summary of themes for effective online learning

The most important concept of learning is motivation within the student, various methods and pedagogical principles support effective communication and methods to promote student motivation. The summary of results from the integrated literature review of the pedagogical theories applied to the requirements for effective online learning are presented in Table 4.2.

Table 4.2: Summary of requirements and applied theory for effective online learning

Principle	Description	Theory	Application
Motivation	Student effectiveness is dependent on student motivation	Behaviourism (Skinner)	Student motivation is driven by underpinning behaviours which are guided by reward or punishment; thus, students remain motivated if positive re-enforcement is present.
		Guided conversation	Guidance from the teacher or tutor on the content provides a personal relationship which stimulates motivation in the student.
Feedback	Individual feedback to students is essential to provide guidance and positive or negative affirmation on their progress towards the academic goal or outputs	Cognitive behaviourism	Giving positive re-enforcement increases motivation.
		Transactional distance	Communication between teacher and student in feedback reduces the transactional distance.
		Guided conversation	Didactic conversation and dialogue between students guide the learning process and increases the student-teacher presence.
		Connectivism	Increase in connections in the internet with open information sources increasing the amount of relevant and irrelevant information students can access. The feedback from the teacher is essential in ensuring reliability of information and correct content being covered in the learning process.
Social interaction	Social interaction promotes the building of a student community, encourages collaboration, student support and motivation	Constructivist	Students learn by analysis and application of information when they are able to share experiences and consider more than one solution to a problem.
		Connectivist	Foster relationships and build of nodes of information via social media and Web2.0 learning management systems or blogs.
		Community of Inquiry	Teacher ensure a community exists in which teaching takes place where a teacher, social and cognitive presence exists.
Learning preference	Proposed methods of learning should include various aspects of student learning preference	Theory of independent study.	The theory of independent study should allow students to learn at their own pace Holmberg (2005) suggests that where students are able to choose their own study methods at their own pace, student motivation is increased.
Technology	Students need access to technology to interact with academic and administrative staff.	Independent study	Chosen technology allows students to learn and interact instantaneously in their own time and space.

4.5 SUMMARY OF RESULTS FOR INTEGRATED LITERATURE REVIEW

From the analysis of information, it is evident that for effective teaching and learning, communication and reputable information communication technology is utilised to establish contact between the teacher and student. The themes in Section 4.3 and 4.4 are based on the requirements for effective online teaching and learning. The prevalent pedagogy for effective teaching and learning includes factors such as student autonomy, mechanisation or industrialisation of teaching, two-way communication and the establishment of a community. This is evident in applying pedagogical principles from the theory of independent study, theory of industrialisation, guided conversation and a constructivist approach.

Although the principles of pedagogical theories emerging from an analysis of the literature are applied within the theoretical concepts of teaching and learning, a document analysis was deemed necessary to offer an in depth understanding of the current guidelines of leading South African universities in offering online distance education.

4.6 DOCUMENT ANALYSIS OF ONLINE LEARNING POLICIES

Various institutions in South Africa offer higher education via online teaching and learning. Policy documents from four recognised South African higher education institutions offering distance education were used to consider current pedagogy and epistemological methods proposed as a framework to ensure effective teaching and learning in existing online distance learning courses. A complete selection of inclusion and exclusion criteria for the chosen institutions were presented in Chapter 3 Section 3.4.1.4.

During the process of data accumulation for the document analysis, it was evident that three of the four universities are traditional institutions which make use of classroom lectures for the majority of the education offered. The addition of exclusive online education programmes are recent developments within these universities and, as a result, the majority of the policy documents are based on the originally drafted procedures for teaching and learning in a classroom environment. Each document therefore only has a small portion of the policy assigned to distance education. Typically, the documents are focused more towards traditional

learning rather than mixed methods or online learning. Documents which were considered in the study are presented in Table 4.3.

Table 4.3: Document types included in the document analysis

University	Number of documents	Document type
A	2	Open and distance learning policy (2016) Quality teaching framework for teaching excellence (2016)
B	2	Teaching, learning and assessment policy (2016) Teaching and learning strategy (2016)
C	2	Policy on teaching and learning (2016) Policy on academic relations (2016)
D	1	Policy on teaching and learning (2020)

The online learning platforms used by the respective institutions were identified on the corresponding webpages. This was determined to identify the applied ICT tools used in conjunction with the guidelines provided. Policy documents on the teaching and learning principles are used to identify the guidelines or frameworks provided to assist teachers in effectively teaching online distance courses. The purpose of policy documents for teaching and learning from the four selected institutions was to provide a framework to inform, monitor and evaluate the decision making, actions and outcomes of teaching and learning activities within the institutions. According to the policy of research ethics, “research findings published in the public domain (for example, theses and articles) which relate to specific participants (for example, organisations or communities) should protect their privacy” (UNISA, 2016:17). Each institution will therefore remain anonymous and are referred to as University A, B, C and D respectively.

Each institutional policy document or guideline on teaching and learning was analysed and four main themes were identified to provide an overview of these respective guiding documents. Themes identified include suggested pedagogy, teaching guidelines, design of learning experience and application of technology and learning management systems. Each of these themes are presented with a summary of the guiding documents provided at the end of the section.

4.6.1 Theme 1: Suggested Pedagogy

Policy documents from each university briefly mention that pedagogical approaches should be aligned with teaching and learning strategies and technological developments. University C (2016) recommends that “opportunities are provided for both autonomous and collaborative learning, and independent study is an integral part of all modules” (University C, 2016:8). Similarly, University B (2016) outlines that relevant pedagogical theories should be selected which allow students to learn independently. University B (2016) further proposes that the pedagogical approach should incorporate the specific needs of students and addresses the importance of the cognitive paradigm to ensuring student autonomy. Likewise, University A (2016) notes that methods of teaching and learning should allow for independent study from the design to completion of all teaching and learning tasks. University D (2020) notes that the approach to teaching and learning is founded on inquiry based and community-based learning. University B (2016) recognises that distance education is somewhat industrialised and states that various components exist within the process of distance education. These components, as stated by University B (2016), “include learning programme planner and developer, transmitter of knowledge, learning facilitator or learning mediator, learning materials developer, assessor, life-long learner and researcher and subject matter expert. In the execution of these roles, members of academic staff will work with, and be supported by, professional support staff” (University B, 2016:14).

Although all four institutions mention pedagogy and the application thereof on a high level, there are no specific principles of implementation suggested. The policy documents further outline proposals for effective teaching.

4.6.2 Theme 2: Teaching Guidelines

University B (2016) stipulates that curriculum design needs to be developed to allow students a metacognitive ability to recognise how knowledge is formed. University C (2016) acknowledges the necessity for innovative teaching and assessment strategies. University B (2016) and University A (2016) both propose that the design of the curriculum is based on cognitive principles and that the teacher needs to provide a solid grounding and should encourage self-directed or autonomous learning. University D (2020) encourages a problem-

solving methodology for teaching. The institutions however do not elaborate further on a framework or principles to guide the teacher to apply a cognitive learning style. The documents further focus on teachers incorporating student diversity and providing effective student feedback.

University C (2016) notes that staff are encouraged to engage with students and to reflect on their teaching methods to ensure that the diversity of students learning styles is accommodated. University C (2016) also proposes that various assessment and pedagogical methods are used and aligned to ensure students can demonstrate knowledge in meaningful ways. The institution does however not give any guidance for which assessment or pedagogical methods or strategies to apply. University B (2016) and University A (2016) propose that an important aspect of enabling an effective learning environment is to ensure that timely, effective and continuous feedback is given. In addition, University A (2016) notes the importance of an assessment strategy which includes summative and formative assessments to ensure that students develop cognitive and practical skills. University B (2016) also stipulates that teachers should have high expectations for students and base their recommendations on the principles of behaviourism by suggesting recognition or reward incentives for the students. University A (2016) refers to a 10-page quality teaching framework for excellence document to support the policy, this provides insight into creating a supporting teaching and learning environment for students through motivation and effective feedback but it does not address the application of pedagogical principles. Several recommendations were made in each policy document to design effective learning experiences.

4.6.3 Theme 3: Design of the Learning Experience

University C (2016) mentions the complexity of teaching and learning in the 21st century and recommends that students are independent students who need to actively engage in a student community. Similarly, University B (2016) notes that the learning experience allows for integrated learning within a community. University B (2016) also states that the institution is committed to the ideals of open distance learning to address and minimise the barrier of time, geographical location and students' pace of learning.

University A (2016) stipulates that student support is imperative to teaching, learning and research via online distance learning. Similarly, University C (2016) recommends that the

institution should cater for the full diversity of students' learning styles and should accommodate this diversity in the curriculum and pedagogy. Likewise, University B (2016) notes that students should have a more personalised learning style. University C (2016) mentions applying technology to ensure collaborative and authentic learning within a community. University A (2016) similarly notes that the student should be the centre of the entire learning process and further mentions that to sustain this, the learning design needs to make use of appropriate technology to ensure ease of use for students via e-mails, videos, audio and mobile phones via social networking. This concept according to University A (2016) is diagrammatically illustrated in Figure 4.1.

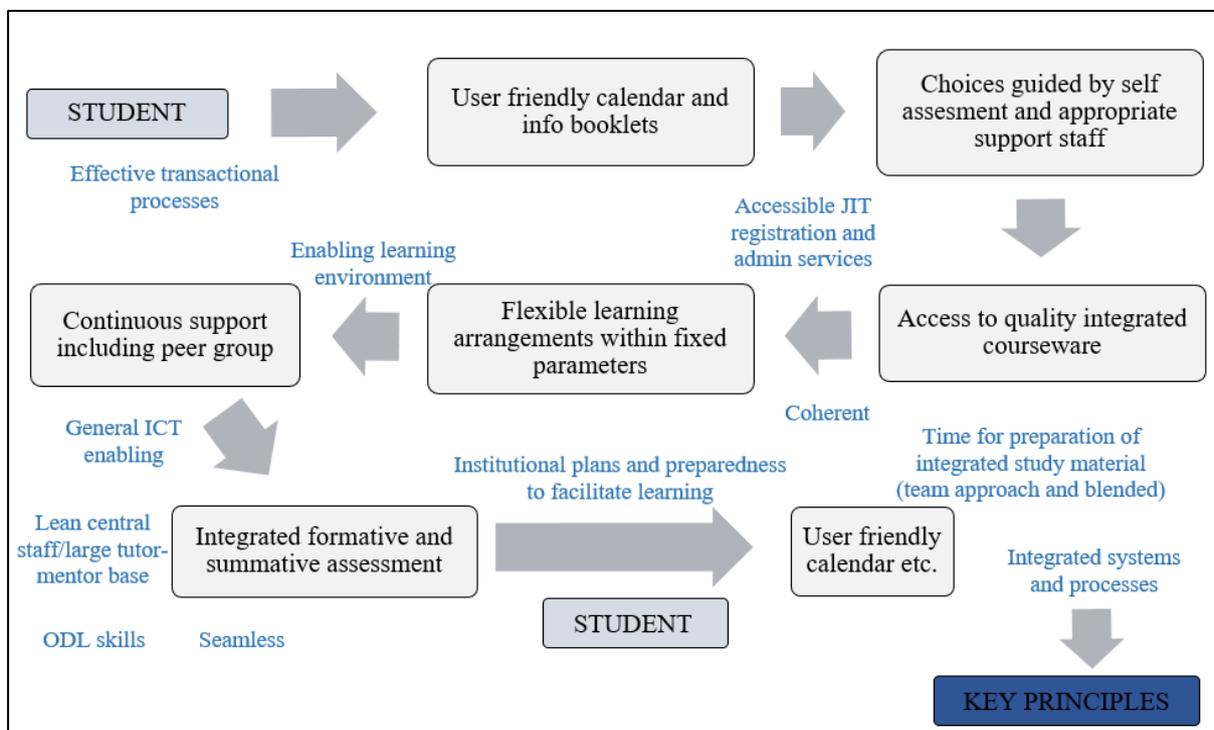


Figure 4.1: Key principles in placing the university at the centre of the learning experience (source, University A, 2016)

All universities were committed to making use of the latest integrated technology tools to support students, and various learning management systems are currently applied.

4.6.4 Theme 4: Applied LMS and Integration of Technology

Each institution offers online distance learning making use of a learning management system designed to support Web2.0 technology. A learning management system (LMS) is a software infrastructure that organises and delivers module content, student and faculty goals, and tracks the progress of meeting these goals while presenting and supporting the process of learning as a whole (Watson & Watson, 2007). Swart (2015) articulates that a learning management system plays an integral part in supporting and supplementing traditional pedagogy used in teaching. A learning management system, according to Swart (2015), provides an important advantage to online learning as it allows students to have 24-hour access to the module content, further stating that student access and support within the LMS has a direct effect on the student achievement within online education. Additional benefits of a LMS, according to Swart (2015), can be summarised as follows:

- a. To promote and facilitate interactive synchronous and asynchronous environments for student-student, student-teacher communication thereby supporting a community of learning.
- b. To enable students to organise and engage in learning activities online which incorporate problem solving, introspection and integration with the latest information available.
- c. To allow teachers to support and provide feedback on assessments and student progress.

University C (2016) and University D (2020) make use of Blackboard Collaborate as a learning management system. Blackboard Collaborate is an online application built for real time collaboration and engagement to improve the learning process by overcoming the barriers of geographical distance (Blackboard, 2020). University C (2016) notes that information communication technologies have predominantly been used to share information, to create a community and to support creativity in promoting collaborative learning. University C (2016) embraces the effective use of technology in teaching and notes that the application of information communication technologies should be combined with authentic and flexible learning. Similarly, University D (2020) notes that additional technological tools are available to supplement their learning experience.

University B (2016) and University A (2016) make use of Sakai as a learning management system. Sakai offers various communication options to allow for effective communication and collaboration through social connections (Sakai, 2019). University B (2016) proposes that the development of structures information communication platforms has allowed the institution the opportunity for pedagogical innovation. University B (2016) suggests that to support effective learning, the mode of delivery should be determined by the student and therein suggest making use of multimodal education by including the most effective combination of modes of delivery to allow students flexible learning opportunities. Similarly, University A (2016) mentions how the multimedia approach enhances student-student, student-teacher and student-tutor relationships and notes that using the best combination of media technologies and programmes to improve the quality of teaching and learning. University A (2016) specifically makes mention of Web2.0 digital media via audio and video podcasting as well as wiki blogs, e-portfolios, discussion forms, learning via cell phones and social networking to support an effective teaching and learning environment.

4.6.5 Summary

While the institutional policies for teaching and learning refer to applying relevant pedagogy, they do not mention clear principles, guidelines or proposed pedagogical approaches for teachers to choose from. Teachers who have experience in teaching using traditional face-to-face methods, will therefore present learning material which is designed for traditional learning environments via electronic format and therefore may not acknowledge the diversity of learning styles. All universities involved in this study recommend self-directed learning which encourages communities and the adoption of teaching to various learning styles. Emphasis is placed on the application of various multimedia technologies to enhance student support and interaction between the facilitator and the student which indicates a high willingness to adapt and apply the emerging Web2.0 technologies in distance learning. The documents ensuring that the technology applied mention that technology should accommodate appropriate pedagogy' however no policy documents provide specific pedagogical applications, guidelines or suggestions. The information from the policy documents is summarised in Table 4.4.

Table 4.4: Summary of policy content for teaching and learning at selected universities

Institution	Theories of teaching and learning	Principles of teaching	Principles of learning	LMS
University A	Collaborative learning	Ensure student support	Autonomous learning	Sakai
University B	Cognitive paradigm	Accommodate diverse learning styles. Encourage development of communities	Inquiry led, self-directed learning	Sakai
University C	Collaborative and independent study	Encourage development of communities/ Accommodate various learning styles	Collaborative authentic, autonomous learning	Blackboard collaborate
University D	Enquiry / collaborative-based learning	Ensure teaching diversity for various learning styles	Inquiry and community-based	Blackboard collaborate

4.7 CONCLUSION

From the synthesis of available literature of the nine chosen pedagogies with the requirements for effective teaching and learning, it is clear that communication, information communication technology, student autonomy, and the incorporation of a learning community through student-teacher and student-student contact is established. Each of the themes for effective learning experiences stress the importance of quality communication methods and dialogue between the teacher and student to guide the student to engage in communication and interaction, receive and act on feedback which ultimately increases student motivation and in turn the commitment of the student. It is also noteworthy that none of these attributes can be identified and applied in isolation, and that each of these attributes needs to be addressed and applied congruently to ensure that on a holistic level, effective teaching methods are applied.

A document analysis of the teaching and learning policies of four South African universities offering distance education is also provided and discussed under four themes. A summary of the pedagogy, effective teaching and learning and learning management systems adopted from each of the universities is also included. The policy documents provide insight into the current recommendations from universities and recognise that distance education is to some form an industrialised process. Yet, throughout all documents it is evident that independent study and

student autonomy is emphasised as the primary pedagogy. The document analysis also presents the importance of student collaboration and a community of students. In the existing policy documents, effective technology, student independence and communication methods are a recurring condition in the requirements for effective teaching and learning. Effective and detailed planning from teaching staff ensure that meaningful communication, feedback, timelines, and goals are set to achieve the requirements for effective teaching. While all universities make mention of applying the best learning management systems and use of technology to ensure high standards of teaching and learning, they are all committed to and willing to adapt within technological applications.

Chapter 5 makes use of the theoretical aspects presented in Chapter 4 and provides a practical approach and recommendations to suggest which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 4 provided a synthesis of the integrated review and requirements for effective online teaching. Effective two-way communication and appropriate technology for this purpose was identified as key attributes to establishing a community, transferring knowledge and motivating students participating in distance education. A document analysis was also conducted to create an understanding of the current guidelines supporting online teaching and learning in selected South African universities. This document analysis indicated that much work is needed in developing practical guidelines for the South African universities offering online education.

Chapter 5 provides a summary of the holistic study by summarising the integrative literature review and summarising the existing research findings. This chapter also answers the main research question and sub-questions to determine which theory or combination of theories is most suitable for supporting and sustaining teaching and learning with specific reference when using Web2.0 technology in distance education. Guidelines with practical examples for effective online teaching and learning are presented as well as recommendation for future research.

5.2 SUMMARY OF LITERATURE REVIEW

The first chapter of this study provided an overall theoretical outline of the research, and within this outline, it was established that the development of the Fourth Industrial Revolution presents the current distance education environment with rapidly advancing and innovative ICT in the form of Web2.0 technology. The study proposes that the guiding pedagogical principles for education need to be adapted or amalgamated to be accommodating to these changes to ensure effective online learning experiences.

An integrative literature review was conducted to first establish the requirements for effective online teaching and learning as well as the required degree of student and teacher centredness. This included the eight requirements for effective online teaching derived from Cable and Cheung (2017) which includes student faculty contact, collaborative learning, active learning,

prompt feedback, time on task, high expectations, diversified learning and the application of technology. In a similar manner, the requirements for effective online learning were elaborated on based on the work by Abell *et al.*, (2016). Five concepts were presented which included student motivation, student feedback, social interaction, learning preference and the use of technology. Furthermore, nine pedagogical theories were presented which were selected from the three main generations of cognitive-behaviourist, constructivist and connectivist pedagogical theories. The majority of the fundamental principles of the pedagogical theories were based on the work of Anderson (2003); Anderson (2008); Bates (2019) and Moore and Keegan (2013). Each pedagogical theory was discussed in detail and the underlying principles of each theory presented. These theories included cognitive-behaviourism pedagogy, the theory of industrialisation, theory of independent study, constructivist theory, theory of guided conversation, transactional distance, connectivist theory, online collaborative theory and the theory of community of inquiry. The literature review included the fundamental principles of each pedagogical theory and examines the requirements under which each theory was developed and applied. Furthermore, each theory was summarised and included the guiding principles, learning systems, teaching systems and application in 21st century.

The integrative review illustrated that each theory does have aspects which are applicable to distance education in the 21st century, even though they were created before the application of Web2.0 technology. The review furthermore highlighted that although many pedagogical theories have been developed and implemented in different settings, there is not one theory which alone addresses the complexities of teaching and learning structures in online distance education in the 21st century but rather that a combination is necessary to ensure an effective online learning experience.

5.3 SUMMARY OF THE EMPIRICAL STUDY

The research design of the study was presented in Chapter 3 Section 3.3. The research paradigm most suitable for the study was the interpretivist paradigm which acknowledges multiple realities which may exist and therefore a subjective opinion could be formed by the researcher. The research approach was qualitative and applied a phenomenological approach which allowed the researcher to provide a summary based on the experiences of students and teachers within the social reality of pedagogical principles applied.

As the researcher, I was the primary collector of data for the integrative literature review and document analysis. Comprehensive inclusion criteria for documents in the literature review and document analysis were presented in Chapter 3 Sections 3.4.1.1 and 3.4.1.3 respectively. Chapter 3 Section 3.4.2 focused on the research limitations and delimitations for various socio-economic and current events pertaining to online distance education. The data analysis and processing followed the three processes of preparing, analysing and interpreting data. Finally, the aspects of trustworthiness and ethical measures were presented in Chapter 3 Sections 3.5 and 3.6 respectively.

5.4 SYNTHESIS OF RESEARCH FINDINGS

The research findings from the integrative review summarises the effective application of specific pedagogical theories into themes, which are the requirements for effective online teaching and learning. The synthesis of this literature analysed each requirement presented in Chapter 2 Section 2.2.1 for effective online teaching and learning which includes student faculty contact, collaborative learning, active learning, prompt feedback, time on task, high expectations, diversified learning and application of technology. In this synthesis, the main pedagogical theories applicable included the theories of cognitive-behaviourism, industrialisation, independent study, constructivism, guided conversation, connectivism, online collaborative theory and community of inquiry. A table was provided summarising the requirements and applications of each of the requirements for effective online teaching and learning in Tables 4.1 and 4.2 respectively.

Ultimately the research findings from the literature study in Chapter 2 Section 2.2.1 and section 2.2.2 illustrated that the most important aspects for effective online teaching and learning included quality two-way communication, student autonomy and the development of a community of learners. The synthesis of pedagogical theories suited for distance education when using Web2.0 technology was presented in Chapter 4 Section 4.5.

The document analysis was conducted with policy documents from four South African universities with four themes emerging which included the pedagogical principles, principles of effective teaching, principles of learning and the applied learning management system. Within this document analysis, it was illustrated that there is a large area of development in

providing sufficient guidelines for distance education programmes. Amongst these universities' policy documents, collaborative learning is the most prescribed pedagogical principle as indicated in Chapter 4 Section 4.6.1; however, the guidelines fail to provide sufficient guidance or a model on which to base the teaching system. The design of the learning experience from the policy documents covered in Chapter 4 Section 4.6.3 encourage a student-centred environment to be applied throughout the learning process. Placing the student at the centre of the learning process and allowing them the independence and control within their learning process is aligned with the findings of the integrative literature review in Chapter 2 Section 2.3.10. The following section aims to answer the research questions posed in Chapter 1 Section 1.4.

5.5 CONCLUSIONS TO RESEARCH QUESTIONS

The conclusions of this research are structured by means of answering each of the sub questions proposed in Chapter 1 Section 1.4.

1. Which theories best support a learning environment when using Web2.0 technology in distance education?
2. Which theories best support a teaching environment when using Web2.0 in distance education?
3. What developments in theories need to take place to best support the use of Web2.0 in distance education?

Each of these answers guides the study to provide an accurate answer to the main research question: *Which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education?*

A guideline for the combination of theories was incorporated to assist in answering the main research question. Each of the sub questions was answered in the following section, after-which the main research question is answered in Section 5.4.4.

5.5.1 Research Question 1

The first research question asks: *Which theories best support a learning environment when using Web2.0 technology in distance education?* When applying pedagogical principles suitable for effective learning, as summarised in Table 4.2, Chapter 4 Section 4.4.5, two

pedagogical theories provide sufficient guidelines to support an online learning environment. The theory of independent study described in Chapter 2 Section 2.3.2, allows students to learn at their chosen pace, and the use of technology allows students to instantaneously interact with the teacher which also increases student retention. In order to ensure that students can effectively learn independently, guided conversation from the teacher as elaborated in Chapter 2 Section 2.3.5, is needed to assist students in choosing correct content and for providing sufficient feedback to direct students' views. The learning theories of behaviourism, constructivism and connectivism support the fundamentals required for an effective online learning environment by providing feedback and re-enforcement of positive outcomes, by allowing students to connect points of information through social interaction and collaboration within a community, aspects which are summarised in Table 4.2.

5.5.2 Research Question 2

The second research question in the study poses: *Which theories best support a teaching environment when using Web2.0 in distance education?* The theories which best support a teaching environment are dominated by two distinct pedagogical theories - the theory of guided conversation and the theory of industrialisation. Although these may seem in contrast to one another, it is clear that effective communication and a structured two-way dialogue between the student and teacher is imperative to ensure that an effective learning environment is created. The application of the theory of guided conversation, as elaborated in Chapter 2 Section 2.3.5, provides sufficient guidance to establish two-way communication between faculty and the student and which supports students to ensure content and methods applied are relevant and expected outcomes are communicated. The application of the theory of industrialisation to support a learning environment in online teaching, creates a streamlined teaching environment for the teacher as well as the institution and in which industrialised principles can be applied. These principles include concentration and centralisation of the information, division of labour, sufficient preparation and planning and mechanisation, as elaborated in Chapter 2 Section 2.3.2. In addition to these primary pedagogical theories, the theories of independent study and constructivism are also applicable in supporting a teaching environment by allowing the barriers in geographical distance to be diminished and by allowing students to study autonomously while applying the problem-solving skills rather than citing the curriculum content.

5.5.3 Research Question 3

The third research question queries *What developments in theories need to take place to best support the use of Web2.0 in distance education?* Chapter 1 Section 1.2.3 discussed the development of pedagogical theories and identifies three generations in which these theories were developed, the cognitive behaviourist model, constructivist theories and connectivist theories. These generations and the development of the pedagogical theories are aligned to the developments in global mechanisation. Of the nine pedagogical principles discussed in Chapter 2 Section 2.3, six of them were developed at a time when distance education was conducted through the means of postal, telephonic and telecommunication systems. These theories include cognitive-behaviourism, theory of industrialisation, theory of independent study, constructivist theory, theory of guided conversation and transactional distance. Thus, the direct and sole application of the theories to distance education making use of rapidly evolving technology in the 21st century will not be suited.

Developments in pedagogical theories therefore need to consider the changing dynamic within the ICT developments as introduced in Chapter 1 Section 1.2.1. Theories need to incorporate the processes which allow students to be at the centre of the learning process, with the teacher as the guide or facilitator to direct the student to construct meaning. It is inevitable that students will use Web2.0 technology, as described in Chapter 1 Section 1.2.1, and theories of distance education therefore cannot negate the possibilities which exist in online tools. Developments in pedagogical theories need to include the consequences stemming from instantaneous availability of information and the use of artificial systems which analyse and process data to create information, allowing students to learn and reach conclusions at a much faster rate. Potential thus exists for students to skip elementary but essential steps in reaching conclusions or meeting objectives within the learning process. Therefore, although the innovative ICT methods should be incorporated, so too should the systematic building blocks of learning processes.

5.5.4 Main Research Question:

The main research question of the study interrogations *Which educational theory or combination of theories is most suitable for effective teaching and learning when using Web2.0 technology in distance education?* In providing a comprehensive answer to the main research

question posed in Chapter 1 Section 1.4, a summary was provided in Table 5.1 which includes various pedagogical theories and their effective applications. It is noteworthy that the table provides a ranking of the pedagogical theories. A significant finding in this study was that no one theory can be applied in isolation and therefore to ensure success, the theories are inter-dependant and conditional to the setting. This finding is aligned with the statement by Crawford (2009) mentioned in Chapter 1 Section 1.1, that there is not a single theory which can be fully applied to distance education.

In the summary provided in Table 5.1, the first three theories of guided conversation, industrialisation and independent study establish the presence of faculty offering distance education by providing the three most essential components for effective distance education. These theories, as elaborated in Chapter 2 Sections 2.3.5, 2.3.2 and 2.3.3 respectively, emphasise the importance of two-way communication, a well-run industrialised faculty or institution to provide the education for independent students who can study autonomously-without which distance education cannot be successfully executed. It is important to ensure that innovative methods are applied as suggested by Xing and Marwala (2017) through the application of additional pedagogical theories, without which 19th century classroom teaching methods will be applied using 21st century technology as a distribution tool.

To ensure the application of Web2.0 technology, the connectivist theory is applied where learning occurs through interpretation while connecting nodes of information thereby forming networks of information from various opinions, data sets and machines. The theory of connectivism, as discussed in Chapter 2 Section 2.3.7, incorporates the rapid generation and availability of educational material produced and stored via the internet. Within the wake of the Fourth Industrial Revolution, Keegan (2019) alludes to e-learning tripling in size in the next five years. It is therefore inevitable, with the accessibility and growth of information available, that students will make use of and connect to various nodes of information, therefore teachers need to familiarise themselves with various applications and guidelines for students making use of the internet. In using all the information which is freely available, students can analyse, design and evaluate the content through active learning and in so doing, students learn and create meaning from the content by applying the constructivist pedagogical principles as elaborated in Chapter 2 Section 2.3.4. This methodology allows students to construct meaning based on the foundations of previous learning. In constructing knowledge based on the students' current reality and previous learning, a change in mental progression occurs which

promotes student thinking. The change in thinking processes, coupled with an external motivating drive by means of measurable outcomes and positive re-enforcement, allows the principles of cognitive-behaviourist principles to be applied. Cognitive-behaviourism includes stages of learning on which the student can build. However, this needs clearly articulated objectives early in the teaching journey. The process of correct planning and clear objectives is also aligned with applying the planning principles within the theory of industrialisation, discussed in Chapter 2 Section 2.3.2. and Chapter 4 Section 4.3.5.

The change in thinking processes and the development of problem-solving skills creates a cognitive presence within the educational experience. This is one of the essential three components discussed in Chapter 2 Section 2.3.9 within the community of inquiry model, which also includes a teaching presence and a social presence. In applying this model, students are encouraged to collaborate across groups to create a community in which students can develop and share knowledge. These collaborative groups also allow the students to share their experiences online in collaborative learning processes, the importance of which is depicted in Chapter 4 Section 4.3.2. Online collaborative learning is a student-centred and student-driven approach which must be guided by the teacher. The amount of guidance provided by the teacher, will determine the perceived transactional distance based on the amount of dialogue and structure provided, this guidance and two-way communication, which includes feedback on the e-learning process, enhances student faculty contact, which in turn promotes motivation, aspects that are elaborated on in Chapter 4 Sections 4.3.1, 4.3.4 and 4.4.1.

Table 5.1 provides a summary of the application of pedagogical theories in distance education when using Web2.0 technology. Examples are provided where teachers can apply principles from various theories. It is important to consider that although an order is provided, no one theory can be used in isolation. Teachers need to understand and familiarise themselves with the application of pedagogical theories and utilise them in such a way that an effective online learning experience is provided for students, within the context of the content shared. The principles depicted in Table 5.1 can also be illustrated in a proposed hierarchy in Figure 5.1, which indicates the application of theories applicable to distance education when using Web2.0 technology.

Table 5.1: Summary, examples and applications of pedagogical theories suited for distance education when using Web2.0 technology

RANK	PEDAGOGICAL THEORY	DESCRIPTION	EXAMPLES OF APPLICATIONS
1	Theory of guided conversation	Personal contact between the institution and the student increases student motivation and guides the student in the use of content through planned and structured two-way communication.	<p>Teachers can rely on one-to-many communications by means of announcement boards in a LMS to establish the connection with students, thereafter two-way communication is encouraged to allow an increased relational feeling to increase motivation.</p> <p>The use of LMS allows teachers to apply polls for students to indicate their progress so that attention is given to specific groups of students falling into categories of progress. Attention and conversations can then be in focused groups to facilitate learning through webinars, blogs or mobile chat groups.</p> <p>Recommended reading lists can be provided to ensure content remains relevant and students are progressing appropriately with clearly stipulated outcomes. The two-way guided conversation can take place via e-mails, video calls, google chats.</p>
2	Industrialisation	Distance education conducted in a similar fashion to standardised industrialised processes	<p>Institutions or faculties to centralise administrative staff and apply the division of labour of specialists to ensure a high standard is maintained while encouraging active learning and participation.</p> <p>Staff to adopt mechanisation and centralisation of employees similar to a factory setting to ensure regular student faculty contact and distribution of study material. The distribution and submission of work via LMS.</p> <p>To reduce work, sufficient planning, clear guidelines, alignment of responsibilities, contact details, deadlines and communications strategies should be shared amongst staff and students via announcement boards, digital calendars which are live and available to staff and students online and via mobile applications.</p>
3	Independent study	Allow students the freedom to determine their own pace of study.	Accommodation of students in various geographic locations by hosting online sessions which to take into consideration various time zones, the use of pre-recorded videos for students to peruse in their own time and blogs

RANK	PEDAGOGICAL THEORY	DESCRIPTION	EXAMPLES OF APPLICATIONS
			<p>used for continuous collaboration amongst students.</p> <p>Accommodation of students with various responsibilities by providing a choice of module block weeks which can be considered over the module duration.</p> <p>Clear descriptions of goals and outcomes to be communicated. Guidelines of expected progress within a time frame to assist students with accomplishing goals in their own order and pace.</p>
4	Connectivism	Students develop various connections of information to aid the learning process.	<p>Learning occurs through interpretations and allows for the use of multimedia tools. Teachers should assist students to make connections and support the maintaining of these connections for further and continuous learning.</p> <p>Awareness that there may be students who are resistant to the learning environment within online community and the need to educate students or introduce online collaboration tools to include diverse range of students.</p> <p>Involve students in online platforms such as blogs and discussions for students to share links and various sources of information within the student community.</p> <p>Include the use of Massive open online courses and various multimedia platforms.</p>
5	Constructivism	Students learn by creating meaning and applying content taught and share experiences.	<p>Provide tools to aid in problem solving to allow students an active learning experience. Teachers should be open to various solutions and experiences from students and should build on this to assist the student to reach the end goal.</p> <p>Teachers should focus on current scenarios or case studies as examples to encourage dialogue, tutors should then pose questions to the students to be followed by video or multimedia discussions and breakaway groups can be used to promote critical thinking.</p> <p>Evaluations should not be based on content alone but rather on the application thereof.</p>

RANK	PEDAGOGICAL THEORY	DESCRIPTION	EXAMPLES OF APPLICATIONS
6	Cognitive-Behaviourism	Promote motivation through positive reinforcement, and setting clear and high expectations.	<p>Clear objectives, expectations and outcomes should be established early on in the learning process.</p> <p>Teachers can focus on motivation of students through setting of goals and positive reinforcement if goals are achieved.</p> <p>Assist in providing timeous feedback on assessments, LMS systems can be used for multiple choice tests or quizzes to provide live automated continuous assessments and grades to allow students to remain motivated throughout the journey of studying.</p> <p>Teachers can focus on students who need various degrees of assistance, to enable students to solve problems and develop a change in their thought process.</p>
7	Community of Inquiry	Ensure that the educational experience, has a social, cognitive, and teaching presence with the correct content and climate to support learning.	<p>Teachers can create a platform where students can form a community. Focus should be placed on allowing group work which encourages students to explore their own opinions and formulate meaning, evaluations should test the understanding and application of the content within the students' respective environments.</p> <p>Introductory videos, frequent and systematic communication and check-ins with student, teachers should be present in discussions, include two-way videos for students and teachers to see and engage with each other, quizzes, class engagement acknowledge class participation</p>
8	Online collaborative theory	Students create communities online through which they can collaboratively develop and share their learning experiences.	<p>Embrace a student-centred approach, and allow students to share experiences and ideas. Teachers can create breakaway groups in various online platforms to stimulate group discussions to allow student to share and listen to other students, share digital whiteboards webinars or panel discussions where students can freely discuss and share experiences and ideas. Monitor interactions and conversation.</p> <p>The teacher should aim to use technology as tools to improve the communication between the student and teacher, this can be done by using dashboards on a frequent basis.</p>

RANK	PEDAGOGICAL THEORY	DESCRIPTION	EXAMPLES OF APPLICATIONS
9	Transactional distance	The perceived transactional distance between the student and teachers is dependent on the amount of structure and dialogue between the teacher and student.	<p>The amount of transactional distance between the student and teacher will be determined by the communication between the teacher. The teacher can control this by the frequency of contributions on online platforms. The autonomy of the student will also depend on the amount of structure provided by the teacher.</p> <p>A median should be established where outcomes are determined by the teachers, but where students have control on the execution thereof.</p> <p>The transactional distance perceived by the students can be influenced by the chosen technology by the institution to ensure that students can be autonomous and still have the structure provided to minimise the distance perceived.</p> <p>Transactional distance can be minimised by using the correct online platforms, providing links to live online events for students to attend, by allowing students to determine their own pace at which to study with milestones for guidance, by providing access to mentors or tutors and by providing regular feedback.</p>

A proposed hierarchy of the nine pedagogical principles, discussed in Chapter 2 Section 2.3, are presented in Figure 5.1. Within a hierarchical diagram, the area of the triangle, as presented in Figure 5.1, is directly proportional to the ranking of the principle. The proposed hierarchy is grouped into three phases when applied, as depicted in Figure 5.1.

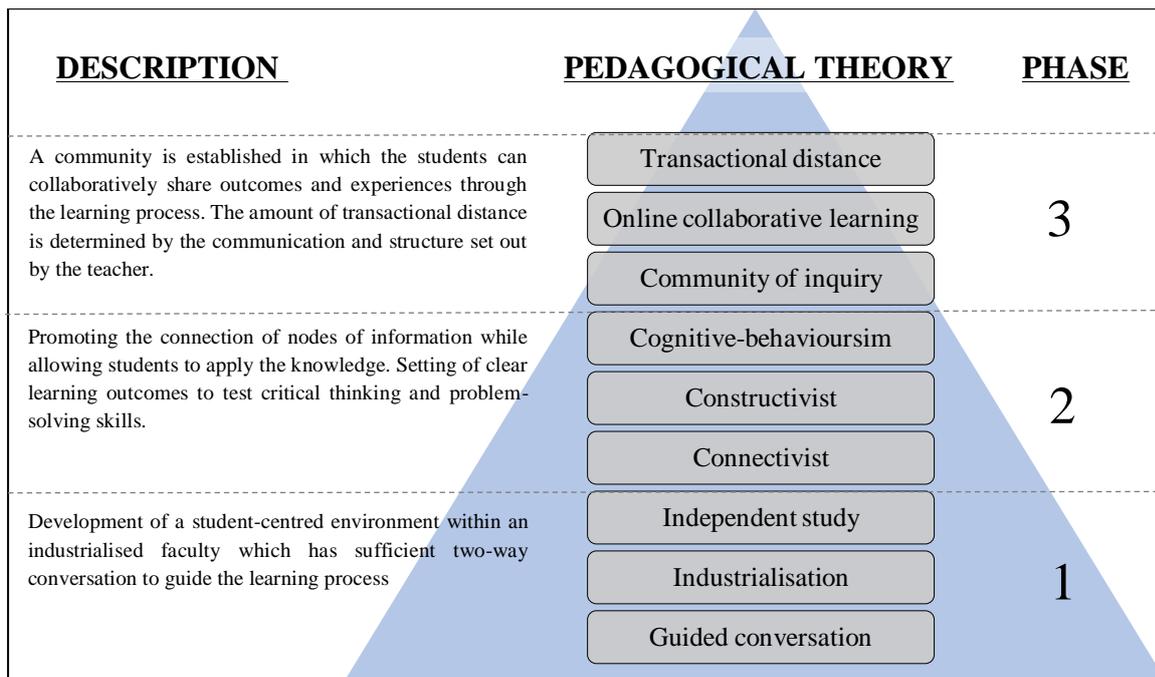


Figure 5.1: A proposed hierarchy of pedagogical theories applicable to distance education when using Web2.0 technology.

It is therefore suggested that in the first phase, institutions need to firstly accept on all levels that the most important aspect is that effective two-way conversation is established to guide the students and the learning processes. This needs to be coupled with a well-managed administrative and academic process and institution for teaching which can be compared to an industrialised system regardless of the number of students. The third-most important pedagogical principle is to ensure that students are able to study independently, and are not limited by their place or time, thereby implying that the ‘distance’ in distance education is removed.

Within the second phase, teachers are able to apply the theories of connectivism, constructivism and cognitive-behaviourism. Herein teachers should assist students in creating various online connections containing information which can be applied within the students’ environment. This will promote critical and problem-solving thinking processes which can be aligned with the academic goals set out by the teacher.

In applying the third phase of the hierarchy, the teachers need to assist in establishing a community in which students can participate during their learning process to share their individual experiences through collaboration. Finally, by applying the principles in the theory

of transactional distance, the teacher will determine the amount of structure and dialogue necessary to decrease the transactional distance perceived by the student.

5.6 RESEARCH LIMITATIONS

The researcher acknowledges that there are three main limitations to the study. The first is that although nine pedagogical theories were analysed for this study, that there are many pedagogical theories and developments that have not been considered. Therefore, a similar study considering different theories may find a different combination or application of pedagogy to guide distance education. A second limitation is that the field of study for distance education is not specified, as teacher and student needs will vary considerably in qualifications which need practical or theoretical classes. A third limitation is the geographical area for the consideration of the research analysis, this study was only conducted on selected South African universities, the majority of which are novices in providing fully online teaching, and also where the majority of the courses offered by these universities still make use of classroom-based teaching. Therefore, policy documents considered may potentially not have had sufficient time to evolve and adapt to the requirements for online distance education. Despite these limitations, I believe that this study has made a useful contribution by identifying and outlining theories which can enhance the online teaching and learning experience.

5.7 RECOMMENDATIONS

Specific recommendations are provided for South African universities offering online education as well as to teaching staff delivering online education.

5.7.1 Recommendations to Teaching Staff

Based on the findings that specific pedagogical principles are not included in policy documents which guide staff, it is recommended that all teaching staff familiarise themselves with the requirements for effective online teaching and learning from both national and international sources to ensure that there is a strategy being followed other than just the sharing and reciting of content. In a similar way, it is also recommended that teaching staff ensure that pedagogical theories guiding the online teaching process include aspects such as planning and structure which is followed within the teaching strategy to ensure that effective learning occurs. To enhance the learning experience, it is of utmost importance that the teaching staff realise that

the technology applied in distance education is not only used as a method or tool to deliver course content which previously would have been delivered via post but should be used as a tool to create a more effective and active learning and teaching experience within distance education. The online tools available on learning management systems need to be integrated in the course material to ensure that the tools are innovatively applied. It is therefore recommended that teaching staff in online modules are familiar with all the capabilities of the LMS used as well as additional ICT tools which may be available.

5.7.2 Authors of Teaching and Learning Policies

The document analysis exposed the lack of guiding pedagogical principles in the teaching and learning policy documents. It is recommended that the authors and committees who develop and approve teaching and learning policies, include specific pedagogical theories which guide the online teaching process. This specifically refers to the universities which do not exclusively offer online education and thus, most of the policy documents are amended from traditional classroom teaching strategies. The policy makers should consider that online distance learning is a completely different approach to classroom learning, and thus the amalgamation of teaching and learning curriculum policies needs to be revised to produce two separate documents.

5.8 SUGGESTIONS FOR FURTHER RESEARCH

The research conducted indicates that there is a need for further research to develop a single pedagogical theory which addresses the complexities of online distance education taking place in the dawn of the Fourth Industrial Revolution. The global education system is being revolutionised by the increasing numbers of online students enrolling in higher education due to internet which has bridged the gap in geographical barriers. Student groups are more dynamic, and therefore applying traditional teaching practices in online settings may no longer be as effective. Research to determine a single pedagogical theory, which is applicable to online learning methods in the 21st century, can be developed through an in-depth qualitative study of effective teaching and learning styles and their applications.

5.9 CONCLUSION

Nine pedagogical theories were examined to determine which theory or combination of theories suits the rapidly changing ICT tools utilised in online distance education. The research indicated that no one theory is suited to apply in effective online teaching and learning, but rather that a combination of theories in various degrees will aid teachers in developing a teaching system which enhances the learning process. It is clear that students participating in online distance education need to be autonomous and a student-centred approach should be adopted. Teachers primarily need to guide the learning process rather than recite content. The correct application of technology is essential to provide two-way communication. The ICT platform through which this occurs is not as essential as the guidance and structure offered in the communication. In a teaching environment, the methods which may previously have yielded successful results from students may no longer be as applicable, as students are instantly connected to information which is freely available on the internet, therefore the teaching process needs to guide the students through a learning process which is self-governed. In some cases, the delivery and provision of academic content are no longer the primary deliverables in distance education as connections of data and information are freely available, therefore institutions need to change to incorporate this dynamic educational process. Recommendations are made for institutions offering online learning to ensure training to administrative and teaching staff is frequently updated, and it is also recommended that the latest LMS and ICT tools are utilised and that guidelines are included which prescribe pedagogical theories as guidelines within the teaching process. It is recommended that teaching staff for online distance education take into account requirements for effective online teaching and learning, guiding pedagogical principles as well as the capabilities of the LMS available. The study clearly elaborates on the rapid changes in technology seen in the Fourth Industrial Revolution and illustrates that similar advances in pedagogical theories are needed to adapt to these changes.

In conclusion, teaching staff needs to find a median to utilise pedagogical theories to structure and guide the teaching and learning process while simultaneously being flexible enough to adapt and change to incorporate innovative teaching methods in a rapidly changing digital age.

REFERENCES

- Abell, N., Cain, M. & Lee, C.-Y.C. 2016. Essential attributes for online success: student learning preferences and faculty teaching styles. *International Journal on E-Learning*, 15(4): 401-422.
- Ally, M. 2008. *Foundations of educational theory for online learning*: Saint Paul University.
- Anderson, T., 2008. *Theory and practice of online learning*. (2nd ed.) Edmonton: AU Press, Athabasca University.
- Anderson, T. 2014. *Three generations of Distance Education Pedagogy: Past, Present and our Networked Future*. Athabasca, Canadian Institute of Distance Education Research.
- Anderson, T. & Dron, J. 2011. Three Generations of Distance Education Pedagogy. *The international Review Of Research In Open And Distributed Learning*, 12(3): 19.
- Anderson, T. & Dron, J., 2012. Learning technology through three generations of technology enhanced distance education pedagogy. *European Journal of Open, Distance and E-Learning*, 2(1), p. 14.
- Arkorful, V. & Abaidoo, N. 2014. The role of e-learning, the advantages and disadvantages of its adoption in Higher Education. *International Journal of Education and Research*, 2(12): 397-410.
- Aspers, P. 2009. Empirical phenomenology: A qualitative research approach (The Cologne Seminars). *Indo-Pacific Journal of Phenomenology*, 9(2): 1-12.
- Baath, J.A. 1986. Learning by written material: Psychological aspects with particular implications for correspondence education.. *Epistolodidactica*, Volume 2, pp. 8-22.
- Bangert, A.W. 2004. The seven principles of good practice: A framework for evaluating on-line teaching. *The Internet and Higher Education*, 7(1): 217-232.
- Bates, A.W. 2019. *Teaching in a Digital Age- Second Edition. Guidelines for Designing Teaching and Learning*. (2nd ed.) Vancouver: Tony Bates Associates Ltd..
- Bengtsson, M. 2016. How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2(1): 8-14.

- Bernath, U. & Vidal, M., 2007. *The Theories and the Theorists: Why Theory is Important for Research: With Borje Holmberg, Michael Moore, Otto Peters*. Castelldefels, Cned/Lavoisier, pp. 427-458.
- Bhowmik, M., Banerjee, B. & Banerjee, J. 2013. Role of Pedagogy in Effective Teaching. *Basic Research Journal of Education Research and Review*, 2(1): 5.
- Blackboard, 2020. www.Blackboard.com. [Online] Available at: <https://www.blackboard.com/resources/about-blackboard-collaborate> [Accessed 25 July 2020].
- Bowen, G. 2009. Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2): 27-40.
- Broome, M.E. 1993. Integrative literature reviews for the development of concepts.. In: *Concept Development in Nursing* . Philadelphia: W.B Saunders, pp. 231-250.
- Brown-Martin, G. 2017. *Education and the Fourth Industrial Revolution*. Groupe Media TFO.
- Bryer, T. & Zavattaro, S. 2011. Social media and public administration: Theoretical dimensions and introduction to symposium. *Administrative Theory and Praxis*, 33(3): 325-340.
- Cable, J. & Cheung, C. 2017. Eight principles of effective online teaching: A decade-long lessons learned in project management education. *PM World Journal*, 6(7): 16.
- Chickering, A.W. & Gamson, Z.F., 1987. *Seven Principles of Good Practice in Undergraduate Education*. *AAHE Bulliten*, 282(491): 3-7.
- Chowdhury, I.A. 2015. Issue of quality in a qualitative research: an overview. *Innovative issues and approaches in social sciences*, 8(1): 142- 162.
- Council of Higher Education, 2012. *Higher Education Act 101 of 1997*, Pretoria: South African department of Education.
- Crawford-Ferre, H.G. & Wiest, L. 2012. Effective online instruction in Higher Education. *The Quarterly Review of Distance Education*, 13(1): 11-14.
- Crawford, J. 2009. *Learning Theories Related to Distance Education*. Boise State University.
- de Souza, M.T., da Silva, M.D. & de Carvalho, R. 2010. Integrative review: what is it? How to do it?. *Einstein*, 8(1): 102-106.

- De Vaus, D.A. 2001. Research Design in Social Research.. In: W. M. Trochim, ed. *Research Methods Knowledge Base*. London: SAGE.
- Department of Higher Education and Training, 2020. www.saqa.org.za. [Online] Available at: <https://www.saqa.org.za/docs/brochures/2015/updated%20nqf%20level%20descriptors.pdf> [Accessed 29 September 2020].
- Diedrich, J.L., 2010. *Motivating Students Using Positive Reinforcement*. Brockport: The College at Brockport.
- Downes, S. (2012). *Connectivism and connectivist knowledge, Essays on meaning and learning networks* (1st ed.). National Research Council Canada
- Dreon, O. 2013. *Applying the seven principles for good practice to the online classroom*, Millersville: Higher Education teaching strategies Magna Publications.
- Duc, T.H. 2012. *Designing distance learning for the 21st century: Constructivism, Moore's transactional theory and Web2.0*, Sweden: School of Computing, Blekinge Institute of Technology.
- Garrison, R. 2000. Theoretical Challenges for Distance Education in the 21st Century: A Shift from Structural to Transactional Issues. *International Review of Research in Open and Distance Learning*, 1(1): 1-17.
- Garrison, R. 2003. Self-Directed Learning and Distance Education. In: M.G. Moore & W.G. Anderson. (eds.) *Handbook of Distance Education*. London: Lawrence Erlbaum Associates, pp. 161-168.
- Garrison, D.R., Anderson, T. & Archer, W. 2003. A Theory of Critical Inquiry in Online Distance Education. In: M.G. Moore & W.G. Anderson, eds. *Handbook of Distance Education*. London: Lawrence Erlbaum Associates, pp. 113-127.
- Giesbrecht, N., 2007. *Connectivism: Teaching and Learning*. [Online] Available at: <http://etec.ctlt.ubc.ca/510wiki/Connectivism: Teaching and Learning> [Accessed 18 November 2017].
- Granger, D. & Bowman, M. 2003. Constructing Knowledge at a Distance: The Learner in Context. In: M.G. Moore & W.G. Anderson, eds. *Handbook of Distance Education*. London: Lawrence Erlbaum Associates, pp. 169-191.

- Hancock, B., Ockleford, E. & Windridge, K., 2007. *An Introduction to Qualitative Research*, Leichester: National Institute for Health Research RDS for East Midlands.
- Harasim, L. 2017. *Learning Theory and Online Technologies*. (2nd ed.) New York/London: Routledge.
- Hathaway, K.L. 2014. An application of the seven principles of good practice to online courses. *Research in Higher Education Journal*, 22: 12.
- Holmberg, B. 1983. Guided didactic conversation in distance education . In: D. Keegan & B. Holmberg, eds. *Distance Education: International perspectives*. New York: St Martins Press, pp. 114-122.
- Holmberg, B. 2005. *The Evolution, Principles and Practices of Distance Education*. (11th ed.) Oldenburg: BIS-Verlag .
- Johnson, D.W. & Johnson, R.T. 1999. Making cooperative learning work. *Theory Into Practice*, 38: 67-73.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J. & Bannan Haag, B. 1995. Constructivism and computer mediated communication in distance education. *American Journal of Distance Education*, 9(2): 7-26.
- Kain, D.F. 2018. Teacher-Centered versus Student-Centered Balancing Constrains and theory in the Composition Classroom. *Pedagogy*, 3(1): 104-108.
- Kamal, S.S. 2019. Research paradigm and the philosophical foundations of a qualitative study. *International Journal of Social Sciences*, 4(3): 1386-1394.
- Kaplan, D.E. 2018. Behaviourism in Online Teacher Training.. *Psychology*, 9(1): 570-577.
- Karatas, E., Karatas, S. & Kaya, Z. 2016. Distance Education. In: A. Eyerci, ed. *Learning and Teaching: Theories, Approaches and Models*. Gazi: Gazi Faculty of Education, pp. 213-234.
- Keegan, D., 1976. Interaction and communication. In: C. Helm, ed. *The foundations of distance education*. Kent: C, pp. 89-107.
- Keegan, D. 2013. *Foundations of Distance Education*. Third ed. USA and Canada: Routledge.

- Keegan, L. 2019. *Staggering Online learning statistics*. [Online] Available at: <https://skillscout.com/online-learning-statistics/> [Accessed 27 April 2020].
- Kiryakova, G. 2009. Review of distance education. *Trakia Journal for Sciences*, 7(3): 29-34.
- Kivunja, C. & Kuyini, A.B. 2017. Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, 6(5): 26-41.
- Koopman, O. 2015. Phenomenology as a potential methodology for subjective knowing in science education research. *Indo-Pacific Journal of Phenomenology*, 15(1): 9.
- Korstjens, I. & Moser, A. 2018. Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 24(1), pp. 120-124.
- Lefa, B. 2014. Piaget's cognitive development Theory: An implication to Education. *Educational Psychology*, p. 9.
- Lincoln, Y. S. & Guba, E. G., 1985. *Naturalistic Inquiry*. 1st ed. Beverly Hills: SAGE Publications.
- Maganga, L. & Ssenkusu, P. 2019. Teacher-Centered vs Student-Centered: An Examination of Student Teachers' Perceptions about Pedagogical Practices at Ugandas Makerere University. *Cultural and Pedagogical Inquiry*, 11(2): 16-40.
- Marczyk, G., DeMatteo, D. & Festinger, D. 2005. *Essentials of Research Design and Methodology*. 1 ed. Canada: John Wiley & Sons, Inc..
- Marquis, J. 2011. *Looking at Connectivism as a New Learning Theory*. [Online] Available at: <http://www.onlineuniversities.com/blog/2011/12/looking-at-connectivism-as-a-new-learning-theory/> [Accessed 15 May 2017].
- Marquis, J. 2012. *What Does Connectivism Mean for Education?*. [Online] Available at: <http://www.onlineuniversities.com/blog/2012/01/what-does-connectivism-mean-for-education/> [Accessed 21 May 2017].
- Merriam, S.B. & Tisdell, E.J., 2016. *Qualitative Research: A Guide to Design and Implementation*. 4th ed. San Francisco: Jossey-Bass.

- Mezeid, A.A. 2016. *What role will education play in the Fourth Industrial Revolution?*. Oxfam, Women's Economic Empowerment Co-ordinator.
- Mohajan, H.K. 2018. Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1): 23-48.
- Moore, M.G. 1983. The individual adult learner. In: Helm K, ed. *In Adult Learning and Education*,. London: s.n., pp. 153-163.
- Moore, M.G. 1997. Theory of transactional distance. In: Keegan, ed. *Theoretical Principles of Distance Education* . Oxon: Routledge, pp. 22-38.
- Moore, M.G., 2018. The theory of transactional distance. In: M. Moore & W. Diehl, eds. *Handbook of distance education*. London: Routledge, pp. 32-46.
- Moore, M.G. & Anderson, W.G. 2003. *Handbook of distance education*. (1st ed.) London: Lawrence Erlbaum Associates .
- Niari, M., Manousou, E. & Lionarakis, A. 2016. The Pygmalion effect in distance learning: A case study at the Hellenic Open University. *European Journal of Open, Distance and e-Learning*, 19(1): 36-52.
- O'Donnel, E., Sharp, M., Lawless, S. & O'Donnell, L., 2015. Learning Theories: ePedagogical Strategies for Massive Open Online Courses (MOOCs) in Higher Education. In: E. McKay, ed. *Macro-Level Learning through Massive Open Online Courses (MOOCs): Strategies and Predictions for the Future*. Dublin: Hershey, pp. 92-118.
- Parveen, H. & Showkat, N. 2017. *Data Collection*, Aligarh: Pathshala.
- Perdue, K.J. 2003. Web-Based Continuing Professional Education: Uses, Motivations, and Deterrents to Participation. In: M.G. Moore & W.G. Anderson , eds. *Handbook of distance education*. London: Lawrence Erlbaum Associates, pp. 615-630.
- Peters, O., 1967. *Distance education and industrial production: a comparative interpretation in outline*.
- Peters, O., 1988. Distance teaching and industrial production: A comparative interpretation in outline. In: D. Sewart, D. Keegan & B. Holmberg, eds. *Distance education: International perspectives*. New York: Routledge, pp. 95-113.

- Peters, O. 2010. *Distance Education in Transition: Developments and Issues*. (5th ed.) Oldenburg: BIS-Verlag.
- Pham, L. T., 2018. *Qualitative approach to research: A Review of advantages and disadvantages of three paradigms: positivism, interpretivism and critical inquiry*, Adeliaide: The Univerisy of Adelaide.
- Piaget, J., 1968. *Six Psychological Studies*. (1st ed.) New York: Vintage Books.
- Piaget, J. 1983. *Handbook of Child Psychology*. (4th ed.) New York: Wiley.
- Picciano, A.G. 2017. *Theories and Frameworks for Online Education: Seeking an Integrated Model*. New York: City University of New York Graduate Centre and Hunter College.
- Piotrowski, C. 2015. Emerging research on social media use in education: a study of dissertations. *Research in Higher Education Journal*, 27: 1-12.
- Prinsloo, P. & Heydenrych, J.F. 2010. Revisiting the five generations of distance education: Quo vadis?. *Progression*, pp. 5-26.
- Rayens, W. & Ellis, A. 2018. Creating a Student-Centered Learning Environment Online. *Journal of Statistics Education*, 26(2): 92-102.
- Rehman, A.A. & Alharthi, K. 2016. An Introduction to Research Paradigms. *International Journal of Educaiton Investigations*, 3(8): 51-59.
- Robinson, C.C. & Hullinger, H., 2008. New Benchmarks in Higher Education: Student Engagement in Online Learning. *Journal of Education for Business* , 84(2), pp. 101-109.
- Roavi, A. 2002. Building sense of community at a distance. *International Review Of Research in Open and Distance Learning*, 1(3).
- Rose, M. 2018. What are some key attributes of effective online teachers. *Journal of Open, Flexible and Distance Learning*, 22(2): 32-48.
- Rutto, D.K., 2017. Pedagogical Theories. *International Journal of Scientific* , 8(6), pp. 2025-2030
- Sakai, 2019. *Sakai Learning Management System*. [Online] Available at: <https://www.sakailms.org/feature-details> [Accessed 24 July 2020].

- Savvidou, C., 2018. *Exploring the Pedagogy of Online Feedback in Supporting Distance Learners*. 1st ed. :IntechOpen.
- Schlosser, L.A. & Simonson, M. 2002. *Distance Education: Definition and Glossary of Terms*, Bloomington: Association for Educational Communications and Technology .
- Schwab, K. 2015. The Fourth Industrial Revolution, What it means and how to respond. *Foreign Affairs*, 12 12.
- Shenton, A.K. 2004. Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information* 22(2): 63-75.
- Sidney, P.F. 2015. *Evaluating a behaviourist and constructivist learning theory for 21st Century learners*, Georgia Southern University, p. 17.
- Siemens, G., 2004. Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1): 15.
- Simonson, M., Schlosser, C. & Hanson, D. 1999. Theory and distance education: A new discussion. *The American Journal of Distance Education*, 13(1).
- Simonson, M., Smaldino, S., Albright, M. & Zvacek, S. 2008. *Teaching and learning at a distance: Foundations of distance education*. (4th ed.): Pearson.
- Skinner, B.F., 1976. *About Behaviourism*. 1st ed. New York : Vintage books.
- Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104(1): 333-339.
- Stem, J., 2015. *Introduction to Online Teaching and Learning*, Susilo, A. 2014. Exploring Facebook and Whatsapp as supporting Social Network Applications For English Learning In Higher Education. In: *Teaching and learning in the 21 Century: Challenges for lecturers and teachers*. Terbuka: Professional Development in Education, pp. 10-24.
- Susilo, A., 2014. Exploring Facebook and Whatsapp as supporting Social Network Applications For English Learning In Higher Education. In: *Teaching and learning in the 21 Century: Challenges for lecturers and teachers*. Terbuka: Professional Development in Education, pp. 10-24.

- Swart, J. 2015. Student usage of a learning management system at an open distance learning institute: A case study in electrical engineering. *International Journal of Electrical Engineering Education*, 52(2): 142-154.
- Symeou, L. & Lamprianou, I. 2008. Approaches of research and methodology . In: S. Spyrou, ed. *Children as social researchers: A resource book for teachers and other educators*: Centre for the Study of Childhood and Adolescence, pp. 12-35.
- United Nations, 2020. *Education during COVID-19 and beyond* , United Nations .
- University of South Africa (UNISA). 2016. *Policy on Research Ethics*, Pretoria: University of South Africa.
- Utecht, J. & Keller, D. 2019. Becoming Relevant Again: Applying Connectivism Learning Theory to Today's Classrooms. *Critical Questions in Education* , 10(2): 107-119.
- Ware, H.B. 2006. *Learner-centered e-learning: an exploration of learner-centered practices in online and traditional instruction in higher education*. Louisiana State University and Agricultural and Mechanical Colledge: LSU Doctoral Dissertation 2491.
- Watson, W.R. & Watson, S.L. 2007. What are learning management systems, what are they not, and what should they become.. *Techtrends*, 51(1): 28-34.
- Wedemeyer, C. 1971. Independent study. In: L. C. Deighton, ed. *The encyclopaedia of education*. New York: Free Press, pp. 548-557.
- Wedemeyer, C., 1973. The use of correspondence education for post-secretary education. In: A. Kabwasa & M. Kaunda, eds. *Correspondence Education in Africa*. London: Routledge & Kegan Paul.
- Wilson, D.W., Longstreet, P., Lin, X. & Sarker, S. 2011. *Web2.0: A Definition, Literature Review, and Directions for Future Research*. Detroit, Seventeenth Americas Conference on Information Systems, pp. 1-12.
- Wittemore, R. & Knafl, K. 2005. The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5): 546-553.
- Wolcott, L.L. 2003. Dynamics of Faculty Participation in Distance Education: Motivations, Incentives, and Rewards. In: M.G. Moore & W.G. Anderson, (eds.) *Handbook of Distance Education*. Mahwah, New Jersey, London: Lawrence Erlbaum Associates, pp. 549-565.

Xing , B. & Marwala, T. 2017. Implications of the Fourth Industrial Age for Higher Education.
Science and Technology, 73(2017): 10-15.

APPENDICES

Appendix A: Ethical clearance



UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2020/09/09

Ref: **2020/09/09/62191489/26/AM**

Dear Mrs ME Dimmick-Touw

Name: Mrs ME Dimmick-Touw

Student No.: 62191489

Decision: Ethics Approval from
2020/09/09 to 2023/09/09

Researcher(s): Name: Mrs ME Dimmick-Touw
E-mail address: m.dimmicktouw@gmail.com
Telephone: 082 337 5201

Supervisor(s): Name: Prof. Geesje van der Berg
E-mail address: Vdberg@unisa.ac.za
Telephone: 012 4294895

Title of research:

Proposed theories of education for effective teaching and learning when using web2.0 technology in distance education

Qualification: MEd Open and Distance Learning

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2020/09/09 to 2023/09/09.

The low risk application was reviewed by the Ethics Review Committee on 2020/09/09 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.



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3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
8. No field work activities may continue after the expiry date **2023/09/09**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **2020/09/09/62191489/26/AM** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,



Prof AT Motlhabane
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motlhat@unisa.ac.za



Prof PM Sebate
EXECUTIVE DEAN
Sebatpm@unisa.ac.za

Appendix B: Editing certificate

To whom it may concern

This letter serves to confirm that editing and proofreading was done for:

Michelle Dimmick-Touw

Open and Distance Learning

University of South Africa

Master's Dissertation

**Proposed Theories of Education for Effective Teaching and Learning When Using Web
2.0 Technology in Distance Education**



Cilla Dowse

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Appendix C: Turnitin breakdown

1/19/2021

Turnitin

Turnitin Originality Report

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Dissertation Chapters 1-5 By Michelle Elizabeth
Dimmick-Touw

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