PERCEPTIONS OF PRIMARY SCHOOL STUDENT TEACHERS REGARDING THE PRACTICAL APPLICATION OF CONSTRUCTIVISM

by

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DECLARATION

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Perceptions of Primary School Student Teachers Regarding the Practical Application of Constructivism

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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DEDICATION

This study is dedicated to

Takunda, Alfred and Isheanesu

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I am proud of the completed study. It bears testimony to my determination and discipline.

I want to thank everyone who helped me to make it to the end, even when it felt that I was not going to make it. The completion of the study is a result of the contributions of so many people who deserve my appreciation. The biggest thanks go to the following:

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ABSTRACT

Constructivism is a relatively recent theory of learning which focuses on using learner-centred strategies in learning. Reform efforts in education in Zimbabwe have been aimed at incorporating constructivist-inspired strategies in the classroom, with mixed results. Some teachers continue to prefer traditional approaches to learning in their classrooms, despite these being teacher-centred and generally looked down upon.

The study examined the perceptions of primary school student teachers regarding the practical application of constructivism in the classroom. A qualitative research design was adopted, and the study was grounded in a constructivist and interpretivist paradigm aimed at understanding perceptions emanating from the lived experiences of the student teachers. In all, eight student teachers were sampled for the study by means of purposive, convenience and stratified random sampling. Data was collected through a literature review, lesson observations and semi-structured individual interviews. The rigour of the study was maintained by ensuring trustworthiness and the credibility of the findings. Ethical issues were adhered to. Data was analysed using Tesch's method of data analysis, through which the researcher identified categories and themes, and reported on in narrative format.

The study findings indicate that student teachers have a positive perception of the practical application of constructivism in learning. Participants expressed the view that the practical application of constructivism leads to deeper learning and greater understanding by learners. Participants nevertheless stated that in their efforts to implement constructivism in learning and teaching during their practicums they experienced a lack of support from mentor teachers and shortages of resources.

Considering these findings, the researcher made several recommendations to various stakeholders with the aim of helping student teachers to be more effective constructivist teachers. The recommendations include the need to carry out more research on the constructivist learning theory and its practical application in the classroom as well as encouraging teachers to apply constructivist learner-centred strategies in their classrooms. The researcher also made recommendations for further research.

KEY TERMS: Behaviourism; Cognitive constructivism; Cognitivism; Constructivism; Learner-centred learning; Perceptions; Primary school student teachers; Radical constructivism; Social constructivism; Traditional learning theories.

OPSOMMING

Konstruktivisme is ’n leerteorie wat betreklik nuut is en wat fokus op die gebruik van leerdergesentreerde strategieë vir leer. Inisiatiewe vir opvoedingshervorming in Zimbabweis daaropgerig om konstruktivisme-geïnspireerde strategieë in die klaskamer te inkorporeer – met gemengde resultate. Sommige onderwysers verkies om steeds tradisionele benaderings tot leer in hul klaskamers te volg, al is dit onderwysergesentreerde benaderings waarop daar oor die algemeen neergesien word.

In hierdie studie is die persepsies van laerskool studentonderwysers rakende die praktiese toepassing van konstruktivisme in die klaskamer ondersoek. ’n Kwalitatiewe navorsingsontwerp is gebruik en die studie is gegrond in ’n konstruktivistiese en interpretivistiese paradigma wat ten doel het om die persepsies vanuit studentonderwysers se werklike (‘lived’) ervarings, te verstaan. ’n Steekproef is onder altesaam agt studentonderwysers gedoen deur middel van doelbewuste steekproefneming, gerieflikheidsteekproefneming en gestratifiseerde ewekansige steekproefneming. Data is ingesamel deur middel van ’n literatuurstudie, leswaarnemings en semi-gestruktureerde individuele onderhoude. Die akkuraatheid van die studie is gehandhaaf deur betroubaarheid en die geloofwaardigheid van die bevindinge te verseker. Algemeen ooreengekome etiekvoorskriftewat by die meeste instellings geld, is nagekom.Data is ontleed met behulp van Tesch se metode van data-ontleding, en sodoende kon die navorser kategorieë en temas identifiseer en in narratiewe formaat daaroor verslag doen.

Die navorsingsresultate toon dat studentonderwysers ’n positiewe persepsie van die praktiese toepassing van konstruktivisme in leer het. Deelnemers het hul oortuiging gedeel dat die praktiese toepassing van konstruktivisme, tot ’n dieper vlak van leer en beter begrip by leerders lei. Deelnemers het egter ook aangedui dat hulle ’n gebrek aan ondersteuning van mentoronderwysers, sowel as ’n tekort aan hulpbronne, ondervind het in hul pogings om konstruktivisme in leer en onderrig te implementeer tydens hul praktiese onderwys.

Met inagneming van hierdie bevinding doen die navorser verskeie aanbevelings aan verskillende belanghebbers, met die doel om studentonderwysers te help om meer

doeltreffend in konstruktivistiese onderwys te wees. Die navorser hetook aanbevelings vir verdere navorsing gedoen.

SLEUTELTERME: Behaviorisme; Kognitivisme; Kognitiewekonstruktivisme;Konstruktivisme; Laerskool studentonderwysers;Leerdergesentreerde leer; Persepsies;Radikalekonstruktivisme; Sosialekonstruktivisme; Tradisionele leerteorieë;

MANWELEDZO

Thyeori ya u fhaṱa nḓivho na mihumbulo miswai tou vha thyeori ya u guda ya zwinozwino yo sedzaho kha zwiṱirathedzhi zwo ḓisendekaho nga mugudi kha u guda. Nungo dza u vhuedzedza pfunzo Zimbabwe dzo livhiswa kha u ṱanganyisa zwiṱirathedzhi zwa u fhaṱa zwo ṱuṱuwedzwaho kiḽasini, na mvelelo dzo ṱanganyiswaho. Vhaṅwe vhadededzi vha khou bvela phanḓa na u takalela u shumisa maitele a kale a u guda kiḽasirumuni, naho izwi zwi tshi ḓisendeka nga mudededzi na u dzhielwa fhasi.

Ṱhoḓisiso yo sedzulusa kuvhonele kwa vhadededzi vha matshudeni vha tshikolo tsha phuraimari musi zwi tshi ḓa kha u shumisa nyito ya thyeori ya u fhaṱa nḓivho na mihumbulo miswa kiḽasirumuniHo shumiswa kuitele kwa ṱhoḓisiso ya khwaḽithathivi, ngudo yo ḓitika nga tshiedziswa tsha u fhaṱa nḓivho na muhumbulo miswa na u ṱalutshedzayo livhiswaho kha u pfesesa kuvhonele kubvaho kha tshenzhemo ine ya khou itea zwenezwo nga vhadededzi vha matshudeni.Kha vhadededzi vha matshudeni vhoṯhe vha malo, vhe vha itwa tsumbonanguludzwa kha ngudonga nḓila ya zwine zwa khou sedzwa khazwo, u swikelelea na tshigwada tshiṱuku tsho nangwaho. Data yo kuvhanganywa nga kha u sedza hafhu maṅwalwa, u sedza ngudo na inthaviwu dza u vhudzisa muthunga muthu dzo dzudzanywaho. Ndeme na u itwa nga vhuronwane ha ngudo zwo itwa nga u vhona zwauri hu na u fulufhedzea na u khwaṯhisedzwa ha mawanwa. Mafhungo a vhuḓifari e a tendelaniwa khao nga u angaredza nga zwiimiswa zwinzhi o tevhedzwa. Data yo saukanywa hu tshi shumiswa kuitele kwa Tesch kwa u saukanya data, hune muṱoḓisisi a topola khethekanyo na thero, na u vhigwa nga nḓila ya u tou ṱalutshedza.

Mawanwa a ngudo o sumbedzisa uri vhadededzi vha matshudeni vha na mbonalo yavhuḓi ya nyito i re khagala ya u fhaṱa nḓivho na mihumbulo miswa kha u guda. Vhadzheneleli vho bvisela vhupfiwa havho khagala uri nyito dzi re khagala dza u fhaṱa nḓivho na mihumbulo miswa zwi livhisa kha vhudzivha ha u guda na u pfesesa huhulwane nga vhagudiswa. Vhadzheneleli naho zwo ralo vho bula zwauri kha nungo dzavho dza u shumisa thyeori ya u fhaṱa nḓivho na mihumbulo miswa kha u guda na u funza nga tshifhinga tshavho tsha ngudo dza nyito vho tshenzhela u shaya thikhedzo u bva kha vhadededzi vhane vha khou guda khavho na ṱhahelelo ya zwiko.

Musi hu tshi khou dzhielwa nṯha mawanwa aya, muṱoḓisisi o ita themendelo dzo vhalaho kha vhadzhiamikovhe vho fhambanaho hu na nḓivho ya u thusa vhadededzi vha vhagudiswa uri

vha vhe vhadededzi vha re na vhukoni kha u fhaṱa nḓivho na mihumbulo miswa. Muṱoḓisisi o dovha a themendela ṱhoḓisiso i yaho phanḓa.

MAIPFI A NDEME: Ufhaṱa nḓivho na mihumbulo miswa; Thyeori dza maitele a kale a u guda; Kutshilele; Nḓivho; Vhadededzi vha matshudeni vha tshikolo tsha phuraimari; Kuvhonele; U fhaṱa muhumbulo; U fhaṱa tshumisano; U fhaṱa nḓivho ya vhuṋe; U guda ho ḓisendekaho nga mugudiswa

ABBREVIATIONS AND ACRONYMS

CDU	Curriculum Development Unit
CR	conditioned response
CS	conditioned stimulus
ICE	International Commission on Education
LTM	long-term memory
MHTESTD	Ministry of Higher and Tertiary Education, Science and Technological Development
MKO	More Knowledgeable Other
MPSE	Ministry of Primary and Secondary Education
P21	Partnership for twenty first century skills
PBL	Problem-based learning
RC	Radical Constructivism
S-R	stimulus and response
STM	short-term memory
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UCR	unconditioned response
UCS	unconditioned stimulus
UNESCO	United Nations Educational, Scientific and Cultural Organization
ZCD	zone of current development
ZPD	zone of proximal development

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CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE PROBLEM

The principal goal of education is to create men and women who are capable of doing new things, not simply of repeating what other generations have done … men and women who are creative, inventive discoverers … The second goal is to form minds which can be critical, can verify and not accept everything they are offered. Jean Piaget

1.1 INTRODUCTION

The study endeavoured to expose primary school student teachers' perceptions of the practical application of constructivism in classroom learning. Learning is an important activity because it is necessary for the survival of human beings. Learning enables humans to adapt to their environment or to change their environment to meet their needs. Humans' capacity to learn makes them versatile beings who are able to adapt to diverse environments. The process of learning enables individuals to acquire new knowledge or modify existing knowledge. Individuals acquire and retain attitudes, understandings, skills and capabilities that cannot be attributed to inherited capabilities or behavioural patterns, and neither to physical development (Illeris, 2009:25; Ormrod, 2016:18).

Schools are mostly responsible for improving learners' learning in a formal way. Schools assist learners in developing their potential, the knowledge and skills to interact with the environment in a successful manner in a world that is always changing. Learners today are living in a world of constant change and governments are concerned about the nature and quality of learning going on in the schools and promote more effective learning in the schools so that learners can cope with the changes. Globally education is experiencing reforms which are being directed at discovering the best way to enhance, enrich and extend learning (Wheeler& Gerver,2015). The reform efforts' main goal is to enable learners to solve complex problems associated with living in a competitive, technologically driven world (Anagun, 2018:825). Learners are living in a world that is different from that experienced by their teachers when they were at school themselves. The world in experiencing changes that are exponential and although education is changing, it is not changing as rapidly as the world is changing. Many traditional systems such as government, healthcare, transport, entertainment, and communications are changing thus creating many external political, economic and social influences that are affecting education.

A new society with new needs clearly requires new methods of learning but education is dominated by old practices that does not sit comfortably with the new. In education there is a struggle between the old and the new, the closed and the open, the traditional and the radical methods of education (Wheeler& Gerver,2015). Schools are enrolling learners from different family and cultural backgrounds. Scientific discoveries and advances in technology are constantly accelerating the amount of knowledge and information available to the learners. The past generations regarded knowledge to be finite and limited but today's society sees knowledge is infinite. Information has become global and instantaneous. Events in one place on the globe affect not only that place but every other place as well. Worldwide internet access has made services and products available to just about anyone, anywhere. Internet and social networking have captured the attention of learners. Learners now have greater access to more information than ever before. Learners have now gone digital and are independent thinkers. Learners have high expectations for speediness and access to information. They learn about the world around them using digital computing devices such as the cell phones, iPads, computers and gaming consoles(Arends, 2012:8; Lynch, 2012:165; Anagun, 2018:825).

A pedagogy that is creative and engaging must be created to meet the learning needs and styles of today's learners (Nations, 2007:284). Teachers must move away from the outdated, broadcast-style methods of teaching dominated by lecturing and drilling, towards learner-focused, multimodal methods of teaching. Teachers must move away from the business of transmitting information to customising learning experiences for learners (Tapscott, 2010:1). Traditional methods of teaching and learning were designed for the industrial age. They cannot deal with the complex challenges in schools that involve preparing learners to face the twenty-first century, which requires learners to have higher order thinking skills and competences (Lynch, 2012:165; Anagun, 2018:826).

Learning theories are being redefined as a result of growing expectations of how learners must be taught. Changes in the context of the schools has also given rise to a myriad of issues that require adjustments in educational practice. The world has become a global multicultural society where new approaches to learning are required. Many societies today are experiencing demographic shifts which affect schools and teachers. Schools must be committed to providing educational opportunities for all children for both economic and social reasons. The increase in the number of learners from different ethnic or racial

heritages, special needs learners, linguistic diversity, and learners living in poverty in the same school is an important demographic shift facing many teachers today. Increasing individualisation and personalisation also offer inclusive and diverse learning opportunities for learners. The role of the school teacher is key to improving school outcomes through influencing the capacity of learners. Teachers face challenges of transforming schools and learning content and methods that were created for a homogenous learner population to meet the needs of a largely heterogeneous learner population. Teachers have to differentiate when deciding on a curriculum and type of instruction and teaching to make learning relevant for all. Teachers must have a repertoire of effective teaching strategies and methods that are far beyond those required previously in order to meet the needs of learners with special needs and from diverse backgrounds. Pedagogy must change to a form that requires learners to engage in powerful forms of constructivist learning where deep understanding and greater independence are fostered. Constructivist learning practices, which inspires teachers to improve learners' learning (Lynch, 2012:165)have emerged to help teachers grapple with questions on how to improve teaching and learning.

1.2 BACKGROUND

In the 1970s, Zimbabwe adopted learner-centred methods of teaching and learning in its educational system. The syllabuses were modified in the light of reforms in education theory that were taking place in more advanced countries (Secretary for African Education's Annual Report,1967:5). Learner-centred methods of learning are essentially constructivist. The reform efforts brought in new and radical perspectives about learning and how it can best be achieved. The reform process involved teachers in the implementation process with perceptions on the nature of the learner and the expectations for teachers also changing.

Zimbabwe's educational system is rooted in the traditional view of education. Traditional views are objectivist which sees knowledge as being constant and unchanging. Traditionalists hold knowledge to be fixed and objective and that humans can access and learn about it through discovery. Teachers who teach in a traditional way transmit knowledge to learners directly in the form of facts, concepts and principles. The belief that knowledge is known and fixed has led to the establishment of curriculum and standards to meet for all learners. Objectivists rely on testing and measurement in schools and at national level to make decisions about where learners should be placed in school and where they go to college (Arends, 2012:17).

Constructivism has emerged as an alternative to the objectivist perspective and it is widely gaining respectability in educational circles. Constructivists regard knowledge to be a personal construction by the learner through experience in a specific context. Constructivism does not regard knowledge as something that is fully known, fixed and transmitted. Constructivists regard learning to be a social and cultural activity where learners construct personal knowledge influenced by the interaction of prior knowledge and new learning events. Learning takes place in communities characterised by high levels of participation and engagement. Learners do not passively receive information from the teacher but are actively engaged in relevant experiences where opportunities are created for dialogue so that meaning can evolve and be constructed (Arends, 2012:17). Constructivist learning requires changes in teacher behaviour when contrasted to many of the behaviours associated with traditional teaching.

In Zimbabwe, the desired shift from traditional methods of teaching to constructivist-based learning approaches has been problematic. Teacher-centred practices still dominate the teaching scene. Behavioural change is rarely a discrete or single event. Often behavioural change occurs gradually and over time. When educators and policymakers are asked to change how they think about education, the change is difficult to achieve because they are being asked to change some of the most fundamental, internalised, taken-for-granted parts of themselves and their belief systems (Jukes & Schaaf, 2019:17).It is now close to four decades since learner-centred pedagogy was introduced in the schools in Zimbabwe, but it seems as though little has changed in terms of the quality of teaching. This is partly because of the tendency for human beings to be uncomfortable with change. People resist change even if the new offers better prospects. Even as transformation gains more support, there is still resistance because of the previous comfortable, existing ways of viewing the world. People hold great fear at the challenge of change and find it is hard to make the change. Sometimes it is so hard that even small change does not happen with one step or decision. (Applefield, Huber & Moallem, 2001:3; Jukes & Schaaf, 2019:7).

The reform efforts in education require teachers to make a shift in thinking to become constructivist teachers. Teachers face the challenge of moving from a traditional view of teaching to constructivist-based learning strategies. Teachers' thinking about teaching and learning affects their capacity to change. Kelly's (1995) personal construct theory posits that individuals frequently hypothesise about experiences. Individuals put together prospects

based on a model of reality they have fashioned through experience and reflection. Individuals come to believe something through accumulated experience and then understand experiences according to those beliefs. These hypotheses, or personal constructs, may be adapted with new experiences, with some being constantly strengthened and established, until over time, they may actually shape experiences, instead of new experiences helping to mould them.

Teacher behaviour results from their beliefs about teaching and learning. The learning theory a teacher holds explains the extent and nature of change a teacher will experience. Beliefs and experiences about how learning occurs are not easy to change. However, in order for change to occur, teachers must look at the constructs or beliefs that weigh on their judgement about learning so that they can modify their teaching by changing their beliefs about learning (Ergnel, 2006:171).

1.3 MOTIVATION FOR THE STUDY

The motivation to carry out this study came out of the researcher's experience in a teacher-education programme that encouraged learner-centred education. As part of his responsibilities, the researcher was part of a group of teacher educators who taught courses in psychology of education and supervised student teachers in their teaching practice.

The supervision relationship is triadic in nature involving teacher educators, classroom mentors and the student teachers. The aim of the relationship is to help student teachers to improve their skills in teaching and learning. Teacher educators supervise and assess student teachers' classroom teaching, providing feedback that highlights student teachers' strengths and weaknesses and also encourage student teachers to reflect on their practice. Classroom mentors also give verbal feedback to the student teachers on their daily practice. The student teachers are therefore always encouraged to think about their practice.

A study of student teachers' perceptions on the practical application of constructivism should have a constructive impact on the design of teacher education programmes. Looking at the practical application of constructivism through the eyes of the student teacher s could contribute to a better understanding of constructivism from a student teacher standpoint and the insights gained from the study could help teacher educators assist student teachers with a good start in their practice as the findings of the study will be integrated in the content and organisation of the teacher education programmes.

Perceptions are the basis of action. Perceptions affect a teacher's classroom practice as well as his or her ability to change. A teacher's beliefs about instruction explains the teacher's classroom practices (Praditya, Asib & Rochsantininysib, 2018:177). Perceptions can be difficult to change, but they can be changed if the will and belief are there. People, generally, do not act differently from what they believe or perceive. Teachers and learners do not adjust easily to changing ways of teaching and teaching and learning as beliefs and experience about education are hard to change (Yoon & Kim, 2016:45). Perceptions about teaching and learning affect classroom practice as well as the student teachers' aptitude to change. Understanding and experience are crucial in bringing about the desired shifts, first in opinion, and then attitudes and beliefs. Student teachers' perceptions about the efficacy of a new approach being proposed for implementation in the classroom can be changed by increasing their understanding of the approach and giving them an opportunity to experience it (Bernhardt, 2015:10).

The researcher was also motivated to undertake the study due to his scepticism of the use of traditional methods in teaching and learning. The researcher is convinced that constructivism should be a vital part of any contemporary teacher education programme. Traditional methods of instruction experienced during the researcher's school days, still dominate most teaching and learning. The researcher has experienced behavioural instructional practices during his school days and at college being taught how to teach and prepare teachers using the traditional approaches. Traditional approaches have served their purpose in that they have produced teachers who are effective at fundamental teaching skills and efficient in classroom management, but constructivism is more effective in helping teachers to accommodate learners with diverse needs in a fast-changing world.

1.4 PRELIMINARY REVIEW OF LITERATURE

This section offers a preliminary literature review of constructivism as well as a review of traditional theories of learning. The review of literature on constructivism includes types of constructivism, which are the major proponents of constructivism and learning in the constructivist classroom. The study of traditional theories of learning is meant to emphasise the importance of change to constructivism.

1.4.1 The Concept of Learning

Learning is a complex topic. There is no agreed upon general definition of learning as many different theories of learning have been formulated. Some of the theories are based on traditional understandings of learning and others reflect new possibilities and ways of thinking about learning. Learning has been traditionally defined as the accumulation of knowledge and skills. Modern conceptions of learning give a broader definition of learning, which includes emotional, social and cognitive dimensions. Learning is sometimes regarded as competence development which is related to the development of the ability to handle dissimilar existing and future challenges in working life and many other fields of practice (Illeris, 2009:1). The establishment of general principles on how people learn should make it possible to produce instructional approaches which facilitate learning. Many theories attempt to explain how learning takes place, ranging from behaviourist to cognitivist ones. Some of the theories, like the behaviourist and cognitivist theories are partially complementary but others like the constructivist are contradictory and incompatible.

1.4.2 Traditional Theories of Learning

In this section, behaviourist and cognitivist theories of learning, two perspectives underpinning most traditional practices of teaching and learning, are explained. Behaviourist and cognitivist theories are underpinned by philosophical assumptions that are primarily objectivistic. Objectivism holds that the world is known and fixed and can be perceived more or less accurately by the people using their senses. Objectivists define learning as a process of interpreting people's senses correctly and responding to things and actions in the objective or real world in a correct way. The field of education has been dominated by objectivism for a long period of time. Most of the traditional approaches to learning and teaching are based on behaviourist and cognitive theories which share philosophical assumptions that are fundamentally objectivist. Objectivism is the direct opposite of constructivism. It fosters teacher-centred methods of learning which tend to transfer realities from the teacher to the learners. Much of objectivist theory is based on the work of behaviourists such as Skinner (Bates, 2015). In the classroom, objectivist teachers help their learners interpret and operate correctly within the real world. Objectivist learning is independent of the learners and is seen as the process of transferring knowledge from outside into the learner (Uden& Beaumont, 2006:10).

1.4.2.1 Traditional approaches to teaching and learning

Traditional approaches are underpinned by behaviourist and cognitivist theories of learning which emphasise the quantifiable behaviours of groups of individuals. Traditional practices of teaching and learning have been used since the Industrial Age where the spirit of the age was characterised by standardised procedures, mass production, technical efficiency and processes that could proceed at a uniform pace. The educational systems aimed at producing learners efficiently and consistently (Jukes & Schaaf, 2019:10). Teachers who practice traditional methods of teaching particularly focus on generating a broad-spectrum of the observed information about the amassed behaviours of people, regarding knowledge to be a finite and limited asset. Traditionalists seek to implement a common curriculum for everyone, prioritise information and prefer teaching methods that transmit the information in some straightforward fashion.

The teacher, in a traditionalist classroom, passes information directly to the learners (Nations, 2007:284; Harasim, 2017:61).Lessons in a traditional classroom are formal and rigid and the teacher is in authority being 'the sage on the stage'. Direct or didactic methods of teaching in which the teacher transmits content information are used (Lynch, 2012:168).The teacher is the source of all information and the learners are the vessels that receive the knowledge passively and memorise the content. The teacher's lesson plans are structured, and learners are not given opportunities to explore and expand their learning. Classroom activities are designed with little regard to learners' experiences, prior background knowledge and practical knowledge of the content. The knowledge that is transmitted to the learners is bookish and often unrelated to the practical knowledge the learners experience in their own lives (Nations, 2007:287). Individual work on specific skills and objectives is emphasised. If group work is organised, learners of similar abilities are often put together. Mastery learning, where learners are taught lower-level skills first before they are allowed to participate in higher-level activities that involve evaluation, synthesis, or analysis (Carnell & Lodge, 2009:5; Nations, 2007:284), is emphasised. Traditional approaches emphasise summative assessment at the end of a learning experience. The teacher administers end-of-chapter and end-of-book tests and other standardised tests which cover the basics and assessment of learners is a separate activity from the learning experience (Nations, 2007:284), to evaluate the content delivered to the learners.

The next two sections will discuss behaviourism and cognitivism. The two theoretical perspectives serve as a basis for understanding the concept of constructivism.

1.4.2.2 Behaviourism

Behaviourism is an earlier theory of learning and one of the perspectives student teachers come across in their educational psychology courses. Student teachers are expected to apply some of the behaviourist approaches in the classrooms. Behaviourism has made a significant contribution to learning and these theories of learning underpin traditional instructional methods. Behaviourism, unlike constructivism, emphasises rewards and punishment as drivers of learning and also emphasises measurable outcomes. It forms the basis for populist conceptions of learning and teaching among many parents and politicians (Bates, 2015). Behaviourism stems from the work of Ivan Pavlov, John Watson, Edward Thorndike and Burrhus Frederic Skinner.

Behaviourism is an objectivist approach to learning and teaching. Behaviourists study observable human and animal behaviour. Behaviourism claims to have a scientific and objective basis. The perspective is widespread and is based on a few principles which are simple to apply (Jarvis, Holford & Griffin, & 2003:24). Behaviourists define learning as a permanent change of observable behaviour which results from experience (Jordan, Carlile & Stack, 2008:21). Behaviourists observe what learners can do in order to explain learning. Some later behaviourists, such as Albert Bandura, however, acknowledge the importance of cognitive activity when they stress the importance of expectation and motivation within the learning process (Jordan *et al.,* 2008:21).

Behaviourists explain that learning takes place through the process of conditioning which comprise classical conditioning and operant conditioning. Classical conditioning is linked to Pavlov's work and operant conditioning to Skinner's work with each type promoting a different behavioural pattern. Classical conditioning is when there is a normal reaction to a stimulus. People appear to be biologically 'wired' to produce a specific reaction a certain stimulus (Jordan *et al.,* 2008:21). Operant conditioning is when the individual reacts on the environment and the response from the environment determines the individual's own actions (Jordan *et al.,* 2008:24).

Behaviourism bases itself on the belief of stimulus and response (S-R). The S-R concept is premised on the reaction made by the learner to a particular stimulus. The stimulus becomes a

reward if the response is something that the learner wants but becomes a punishment if the response is something not wanted by the learner. The individual will respond accordingly to the presentation of the stimulus and this will produce noticeable changes in behaviour. Behaviourists see knowledge as something that is fixed and consider learning to be the outcome of external events, such as rewards and punishment (Arends, 2012:260; Bates, 2016:22).

Behaviourists put forward the idea that people must be directed. In a behaviourist classroom situation, the teacher is an authority figure who is responsible for directing all learning with precision. Behaviourist teachers work out objectives that express with accuracy the behaviours that learners are supposed to learn. The teacher arranges the cues which can elicit the desired responses. The teacher controls all classroom activities and determines the nature of the desired behavioural changes to be produced. The teacher provides learning experiences, such as practice, in which learners' learning can be monitored and feedback provided. The teacher arranges the rewards and punishment systems in the class to enable learners to make the correct responses in the presence of those target stimuli. Particular attention is paid to how behaviours in the classroom are rewarded. According to the behaviourists, the exhibition of a new behaviour indicates that learning has taken place (Arends, 2012:298; Ertmer & Newby, 2013:50).

However, behaviourism faces some ethical problems. Behaviourism is an autocratic and transmission-led approach, it does not recognise the independent and enquiring nature of learners (Bates, 2016:24) and in addition, it takes away the learners' autonomy. Behaviourist approaches to instruction produce outcomes which are conformist and rely upon those in authority to specify the correct form of behaviour. Behaviourist-based instruction promotes indoctrination because the teacher controls the learners' learning in order to bring into being the desired results. Behaviourist learning does not encourage learners to be independent thinkers - it is a socially and culturally strict and rigid system of reproduction where learners learn to conform to the conventional situation. Behaviourist teachers use whatever positive or negative reinforcers are needed to ensure that the desired results are realised (Jarvis *et al.*, 2003:30). Behaviourism is not able to account for all kinds of learning, since it discounts cognitive processes. It does not explain some forms of learning such as the learning of a language by young children where there is no mechanism for reinforcement. Behaviourist modes of instruction offer limited opportunities for transfer of learning which is a very

important goal in education. Transfer of learning is defined as learning in one situation which affects learning in other situations (Gould, 2012:18; Hassim, 2019:94). Learners should transfer their knowledge and skills to the world out there after school; however, transfer of learning takes place only when there is resemblance between situations but generally the array of generalisations is fairly narrow in a behaviourists-based instruction (Gould, 2012:19; Hajian, 2019:94).

1.4.2.3 Cognitivism and information processing

Cognitivism is a more scientific approach to learning and offers a more logical perception of the learning processes. Cognitivist learning theory is, however, teacher-centred. The theory focuses on the teacher and the design of instruction. Cognitivists regard knowledge to be fixed. Cognitivists regard learning to be the process of acquiring and retaining accurate information through cognition and mental activity. The perspective assumes that knowledge is transmitted to the learner by the teacher. As in behaviourism, cognitivism focuses on individual learning perspectives and procedures. The model retains a didactic model because it assumes that the primary responsibility of the learner is to assimilate what is presented by the teacher. The learner is portrayed as a processor of information who takes up information, performs cognitive operations on it, and stores it in memory. Cognitivism differs from constructivism in the assumption that knowledge is not static. Piaget and Vygotsky are the two best known cognitivists though they later moved to constructivism. Piaget was more influential in the West and Vygotsky was more influential in Eastern Europe (Arends, 2012:267; Harasim, 2017:60).

Cognitivism reacts to the simplistic and rigid emphasis of the behaviourists on the predictive stimulus-response notion. Cognitivism recognises the impact of reinforcement on the probability of certain behaviours but emphasises the mental or cognitive systems to explain learning. Cognitivists explain how the mind works and how the memory system affects knowledge acquirement, transmission and storage for later retrieval. Cognitivism rationalises its approach by positing that if it were possible to devise accurate models, then it would be possible to create or prescribe learning processes to address more complex behaviours (Arends, 2012:268; Harasim, 2017:60).

Cognitive theories provide a more specific account of the cognitive processes that occur during learning. Cognitive theories view people as information processors and pay attention to complex thought processes. Cognitivists regard learning as a procedure of gathering all

related pieces of information simultaneously until they start to form a complete picture. The mind of the learner actively processes the information and the establishment of relationships between the various bits of information which then results in behaviour change (Bates, 2016:39). Cognitivists devised the information processing model to explain how the mind processes information. The information processing model holds that learning consists partially of the formation of associations and portrays the mind as a structure which consists of components and procedures for using the components in processing information. Information is encoded as symbols and procedures(Harasim, 2017:51) .Memory and thinking, central to the information processing model, consists of three components namely sensory memory, short-term or working memory and long-term memory (Arends, 2012:269).

Cognitivists use the concept of the schema to explain how people organise information about particular subjects. The concept of the schema is related to mental representation and structured knowledge. The schema influences how people process new information and ideas. Learning becomes easier if new knowledge can be compared to existing knowledge and is organised. The notion of the schema considers how a learner's thought processes uses prior knowledge to help him or her develop skills. Schemata help to prepare the learner to process new information by seeing relationships. It is easier for a learner to process new information and to see abstract relationships if the learner's prior knowledge and schemata for a particular topic are more complete. Knowledge is organised in the memory through a system of networks. Prior knowledge sorts out new information and determines how well new information presented by a teacher is incorporated and stored by the learner (Arends, 2012:271; Harasim, 2017:51).

Cognitivism promotes teaching approaches that point to the importance of knowing that knowledge is organised and prearranged around central themes and merging ideas. Cognitivism also draws attention to the fact that learners differ in the way they organise their knowledge about particular topics which means that learners' schemata differ in various ways. The information processing model attaches great significance to how each memory component works and how knowledge is represented. Prior knowledge and existing cognitive structures play an important role in determining learners' ability to learn new ideas (Jordan *et al.,* 2008:48). Cognitivism is thus the starting point for constructivism because it combines the cognitive processes and shared meaning processes of the constructivists. However, cognitivism is still seen as a traditional approach, because both behaviourists and cognitivists

share a similar epistemology of objectivism. Objectivism holds that knowledge is known by the teacher who will predigest and then transmit it to the learner (Jordan *et al.*, 2008:51; Harasim, 2017:60).The emphasis on cognitive processes, however, forms the basis for numerous approaches to teaching and learning such as social cognitive, information processing, cognitive constructivism and social constructivist approaches (Santrock, 2011:218).

Cognitivism offers a theoretical base for instructional practices and proposes an assortment of valuable approaches that encourage learning. Cognitivist teaching mainly consists of transmission of knowledge where the teacher helps the learners to get and maintain precise and declarative knowledge and the endeavours to expand their cognitive development. Declarative knowledge is the truth and generalised information known by individuals (Arends, 2012:267). Teachers design learning experiences that optimise the processing of information if they understand how learners process information. Cognitivists prefer teacher-centred methods of instruction such as lecturing and reading textbooks. In their most extreme form, cognitivists see learners as passive recipients of information from the teacher (Arends, 2012:269).

1.4.3 Constructivism

Constructivism is regarded as an epistemology and a learning theory. Constructivist epistemology explains the nature of knowing. Constructivist learning theory emphasises the active nature of learning. Constructivist epistemology and its fundamental ideas go a long way back in history (Pritchard & Woollard, 2010:8). Constructivist thinking stretches back for two thousand years in the Eastern tradition and in Western thinking, it stretches back for almost three hundred years. In the eastern tradition, Gautama Buddha and Lao Tzu are often cited to indicate the beginnings of the idea. Western Greek philosophers such as Heraclitus, Protagoras and Aristotle are regarded as the earliest Western constructivists (Pritchard & Woollard, 2010:4). A more focused consideration of learning puts the actual growth of constructivist theory in the twentieth century. It appeared in Europe and was initiated to the United States in the 1970s. The onset of social reform and civil rights movements challenged the old and established ways of doing things. The social movements impacted education and at a point when cognitivist views had come under disapproval. Constructivism is an alternative to classical rationalism and empiricism and emerged in reaction to the S-R idea of the behaviourists. Constructivists are pragmatic and relativist in nature, recognising the role

the mind plays in influencing cognitive processes though in a slightly different way to that of the information processing model of the cognitivists (Pritchard & Woollard, 2010:4; Harasim, 2017:62).

Constructivist epistemology is quite different from the objectivist epistemology of the behaviourist and cognitivist theory. Constructivist epistemology regards scientific knowledge as something built by the scientists and not discovered by humanity (Pritchard & Woollard, 2010:3). Constructivists oppose positivism by arguing that scientific knowledge is built by the scientists and not discovered by humankind through an austere scientific method. Constructivists regard knowledge construction as something very subjective. In the classroom it is the learner who constructs the knowledge through his or her interaction with his or her environment. In contrast to behaviourists and cognitivists, constructivists see knowledge as something that is dynamic and changing and not absolute and finite (Schunk, 2012:230; Harasim, 2017:62).

Constructivist learning theory is an umbrella term that represents a number of perspectives based on two or more rather different positions. The perspectives share some general denominations in that learning is a dynamic method of building up knowledge rather than obtaining knowledge and that teaching is a process of sustaining that construction rather than transmitting knowledge (Harasim, 2017:62). Jean Piaget and Lev Vygotsky are associated with constructivism. There are also two major camps associated with constructivism. Out of Piaget's thinking and research emerged cognitive constructivism which focuses on the individual learner. Cognitive constructivism emphasises the individual learner's understanding of the world through biological developmental stages. Vygotsky's social constructivism emphasises the social and cultural contexts of knowledge construction (Harasim, 2017:63).

1.4.3.1 Teaching and learning in the constructivist classroom

Constructivism sees learning as the result of mental construction. Constructivism upholds personal knowledge and meaning construction by the learner through experience. Learners are at the centre of the learning process, actively involved in the creation of their knowledge and understanding through interaction with the environment and in reorganising their mental structures. Constructivism attaches great importance to the role played by prior knowledge in learning. Prior knowledge underpins all forms of knowledge construction with learning taking place in the backdrop of what is already known. Learners need to experience and

reflect on things in order to construct knowledge and reconcile new ideas and experiences with the old. They either change their old beliefs or discard the new information as unrelated (Pritchard, 2013:27).

Constructivist learning theory which aims at creating proper cognitive activity during the learning process, promotes a number of teaching approaches. The goal does not necessarily involve behavioural activity during learning. The approach relies largely on guided discovery, avoiding direct instruction. Learners are led through questions and activities that foster discovery, discussion, appreciation and verbalisation of new knowledge. Learners are actively involved in experiments and authentic problems, creating their own knowledge and then reflecting on and explaining how they reach their conclusions. Constructivism emphasises that teachers and peers contribute to learners' learning, where the teacher's role is to facilitate the learning process (Bada, 2015:67). Constructivists use strategies that make learning happen such as scaffolding, cognitive apprenticeship, tutoring, cooperative learning, situated learning, authentic learning, mediated learning, Top-down processing, zone of proximal development (ZPD), meta-cognition, self-regulated learning and discovery learning.

Constructivism uses generative learning approaches which transform incoming information into usable knowledge. The strategy depends on learners attempting to make sense of information presented to them, assumes that individuals actively build their own perceptions about the problems, scenarios and experiences in the environment surrounding them. In generative learning, learners learn specific methods of doing mental work with new information and construct and understand the material so that they can apply it in new situations. Generative learning strategies use approaches such as problem-based learning, discovery learning, inquiry-based and project-based learning (Slavin, 1987:273; Fiorella &Mayer, 2015:2).

1.5 PROBLEM STATEMENT

In Zimbabwe, education curricula and teaching methods are changing. In the 1970s, Zimbabwe adopted the New Approach as a policy guideline which is essentially constructivist. Constructivism is a better way to teach as it emphasises learner-centred classroom practices, regarded more effective than teacher-dominated practices (Bates, 2015).

However, change has been slow in Zimbabwe even with policy changes and as a result teacher-dominated classroom practices are still dominant in the schools. Constructivism

represents an important paradigm shift in instruction which brings in new ways of thinking about a subject. Student teachers' perceptions are rarely taken into consideration in teacher education programmes. Teaching in colleges of education is mostly a one-way form of thinking in where knowledge is transmitted from the lecturer to the student teacher. there are some studies on student teachers' perceptions on various issues but there are gaps in knowledge and understanding of student teachers' perceptions of the practical application of constructivism. Student teachers reflect on the technical aspects of teaching and also on the broader issues that are part of their educational environment. Research into student teachers' perceptions about constructivist teaching and learning gives the student teachers a chance to reflect on teaching practices and develop a sound base in best teaching practices. It will also assist teacher educators in adapting their way of presenting constructivist approaches in the curriculum to make it more practical for application in schools.

1.6 RESEARCH QUESTIONS

1.6.1 Main Research Question

The main research question that will guide this study is: *How do primary school student teachers perceive the practical application of constructivism in teaching and learning?*

1.6.2 Sub-research Questions

1. What does the practical application of traditional approaches entail in teaching and learning?
2. What does the practical application of constructivism entail in teaching and learning?
3. How can primary school student teachers be assisted in applying constructivist principles in the classroom?

1.6.3 Main Aim

The main aim is to study perceptions of primary school student teachers regarding the practical application of constructivism in the classroom in order to assist them in applying the principles during their practical training and once they start their teaching career.

1.6.4 Objectives:

Research comprises a review of literature and an empirical study.

The literature review research focuses on:

1. Examining the practical classroom application of traditional approaches (behaviourist and cognitivist) in teaching and learning.
2. The practical classroom application of constructivism in teaching and learning.

The empirical research covers the following aims, namely to:

1. Explore primary school student teachers' views about the place of traditional approaches in teaching and learning.
2. Explain primary school student teachers' perceptions about the place of constructivism in the classroom.
3. Give guidance to primary school student teachers on how to apply constructivist principles in teaching and learning.

1.7 RESEARCH DESIGN AND METHODOLOGY

1.7.1 Research Paradigm

A research paradigm is a broad term that includes elements of epistemology, ontology, theory and methodology. A research paradigm is a way of looking at the world, including a view of how research should be done. It is a position or statement about the world. It is also a concern about proper practices and themes for searching into that world. Research methods are in the end based on and resulting from paradigms. On the other hand, paradigms have implications for research methods (Punch & Oancea, 2014:16).

The main paradigm positions are positivism and interpretivism-constructivism. The interpretivist-constructivist paradigm, which guides this research, is associated with qualitative research methods. Interpretivism emphasises interpretation as well as observation in understanding the social world (Ormstein, Spencer, Bernard& Snape,2014:13). This study is focused on studying the perceptions of the student teachers in the practical application of constructivism in teaching and learning. The study of student teacher's perceptions of the practical application of constructivism in teaching and learning relies on how student teachers interpret their experience of the application of constructivist principles in the primary school classroom. The approach of this study is an internal one that seeks, listens to and frames the voices of the student teachers.

1.7.2 Research Design

A research design is a detailed outline of how the research is to be carried out. It is the blue print for conducting a study through a high level of control over things that may get in the way with the validity of the findings (Burns & Grove, 2003:195). It is the logic or master plan of research and directs the way in which the study is to be conducted. It encompasses the topic to be covered, the population, the research methods and the intention of doing the research. Qualitative research that is focused on interpretation, encompasses the shaping of the problem from the literature, research question formulation, sample selection, the collection and analysis of data, and the presentation of findings. It is important to have an understanding of the process because it is used to assess the rigour and value of the individual reports (Merriam & Grenier, 2019:12).

A case study design was used to carry out this study. Case selection is the foundation of qualitative research. A case study is a thorough analysis of a single phenomenon which is studied holistically by one or more methods. The case may be a single unit such as one individual, a group, an event, decision, period, project, policy, institution, or other phenomenon or system. The case that is the subject of inquiry enables a topic of theoretical interest to be illuminated, analysed and explicated (Gary, 2019:2). The research design in this study was a single-site case study of primary school student teachers at a teachers' college in Zimbabwe. Participants from the cohort of 2018-2020 were observed and interviewed whilst on their teaching practicums. The study was done through classroom lesson observations and individual interviews to gather information on student teachers' perceptions. The discussion of the data that was collected is done in Chapter Four.

1.7.3 Research Approach

Creswell (2013:31) describes research approaches as the plans and procedures for research that cover the choices from broad suppositions to thorough processes of data compilation and analysis. An approach is the total of standards, beliefs, statements and regulations regarding the specific research. The plan involves several decisions that entail influencing the design to be used to study the topic. The decision is informed by the paradigm chosen to underpin the study. The decision is also informed by the plan of inquiry and particular methods of data compilation, analysis and interpretation.

Three different research approaches in social sciences can be identified. These are qualitative, quantitative and mixed methods type of research. Each approach is characterised by its own methodology and terminology. Quantitative and qualitative research approaches stand for two extremely diverse ways of viewing the world. The two approaches come from dissimilar theoretical statements that outline the methods researchers use to solve problems and gather and analyse data. Mixed methods research is a research approach that lies in between the two approaches, including a component of the qualitative approach along with more quantitative components (Merriam & Grenier, 2019:11).

A qualitative approach was adopted for this study as it is helpful in studying human occurrences. Qualitative research is concerned with the studying of how individuals comprehend and experience their world at a given moment and in a particular milieu. The exploration of how people understand and interrelate in their community, and the significance it has for them, is grounded on an interpretivist-constructivist perspective entrenched in a qualitative approach (Merriam & Grenier, 2019:4). Qualitative research was deemed effective for studying student teacher's perceptions as the approach is grounded in an epistemology that values a human-centred approach to research. It underscores the significance of appreciating people's beliefs about the world and how they interact in it (Given & Winkler, 2014:4).

1.7.4 Population and Sampling Procedures

Ary, Jacobs, Sorenson and Razavieh (2010:148) identify a population as all members of any distinct group of people, events or objects. The population of this study was the total number of student teachers doing a Diploma in Education course at the teachers' college targeted for the study in Zimbabwe. The total number of students at the College for 2019, from first years to third years, approximated1800. The target population was the group of second year student teachers on teaching practicums. The accessible population were the student teachers on practicums in Gweru urban district in which the teachers' college is located.

A sample is a small portion of the target population that the researcher intents to study (Wilson & Shauna, 2019:5). Sampling involves taking smaller portions from the target population for observation and analysis. The sampling process involves the choice of the research site, time, people and actions in field research (Johnson & Christensen, 2004:197; Best & Kahn, 2005:12; Burns & Grove, 2005:233;Creswell, 2013:142). Samples give researchers more control over the participants, more in-depth study, and more accurate

information than studying an entire population (Magwa & Magwa, 2015:63). The participants in a study compose a sample.

Qualitative research enquires about the significance of a phenomenon from the point of view of the participants. It is imperative for a researcher to decide on a sample from which a lot can be learned. Most qualitative research relies on purposive or purposeful sampling (Merriam& Grenier, 2019:13). Purposive sampling is intentional sampling done with some reason or focus in mind. The researcher determines the criterion that is essential in choosing what sites are to be observed or who is to be interviewed (Merriam& Grenier, 2019:14). Purposive samples provide the researcher with a deeper understanding of the field of study in a qualitative approach (Ary *et al.,* 2010:428). The population for the study was selected through purposive sampling. Population for the study, the class or group of interest to the researcher of this study was a group of primary school student teachers from a teachers' college in Zimbabwe on teaching practicums in 2020, selected through purposive sampling.

Convenience sampling was done to select the area where the research will be done. Convenience sampling is a type of non-probability sampling where a portion of the target population meet certain standards such as ease of access, geographical closeness, accessibility at a given time, or the eagerness to take part are incorporated for the purpose of the study (Ary *et al.,* 2010:431). It involves the use of whatever participants are available. It takes advantage of cases, events, situations or informants that are nearby (Punch & Oancea, 2014:211). The research was based on primary school student teachers, being trained to teach primary school classes 3-7 (8–13-year-olds), from a selected teaching college doing teacher practicum in Gweru, Zimbabwe, and were considered easily accessible to the researcher.

Participants for the study were drawn from the population through a process of stratified random sampling. Stratified random sampling is a type of random sampling appropriate for largely homogeneous populations, in which the population is put into two or more groups according to one or more characteristics. Stratified random sampling aims at guaranteeing that the sample symbolises particular standards and endeavours to guarantee that subgroups adequately reflect the balance of different constituencies within the population (Mertens, 2010:322). The second-year primary school student teacher population was divided into two strata according to gender to achieve a depiction of both genders in the sample group. Simple random samples of four participants were taken from each stratum and then combined to

come out with the desired eight participants. A table of random samples was used to sample participants in each stratum.

1.7.5 Data Collection

Empirical qualitative research requires a concrete base to work with (Gaudet & Robert, 2018:4), which makes data gathering a critical component of research. Data collection is the accurate and methodical gathering of information pertinent to the topic, together with its sub-questions. Various tools are used for gathering data. The gathering of the right data and the results of data analysis influence and determine the conclusions and recommendations of a study. In this study, data was collected to learn about the perceptions of student teachers with regards to the practical application of constructivism in teaching and learning. The forms of data that were gathered were verbatim accounts, field notes and observations. The primary sources of data for this study were student teachers on teaching practice.

A research instrument is a tool designed to measure knowledge, attitude and skills. The methods used to gather data and the sampling plan should be consistent with the purpose and questions for undertaking the research. In qualitative research, observations, interviews, and documents are the prevalent methods used for gathering data (Punch & Oancea, 2014:181; Gaudet & Robert, 2018:4; McWhorter & Ellinger, 2018:192). Data gathering methods that were used in this study were classroom observations and individual interviews. These qualitative methods were helpful in bringing out the experiences and perceptions of student teachers on the practical application of constructivism in teaching and learning.

Student teachers were observed whilst teaching and interviewed after the lesson. The researcher observed the teaching of the primary school student teachers (Appendix J). Interviews were the main source of data collection with student teachers being interviewed on their perceptions of the practical application of constructivism. The researcher conducted the interviews, which consisted of open-ended semi-structured questions (Appendix I), in a room provided by the school administration within the school premises.

1.7.6 Data Analysis and Presentation

Data was analysed in order to comprehend and increase knowledge from the gathered data. Data analysis needs a combination of ingenuity and methodical probing, a mix of motivation and attentive discovery (Spencer *et al.,* 2014:270).Qualitative research focuses on recounting and understanding people's lived lives and the significance people bring to it and to their own

behaviours within its normal surroundings. The depth and intricacy of qualitative research means that there are diverse ways of analysing social life, and therefore there are also numerous points of view and applications in the analysis of qualitative data (Flick, 2018:11). For example, Yin (2014:101) identified five analytical techniques namely prototype matching, clarification, time-series analysis, judgement models, and cross-case analysis. Researchers advocate for comparative analysis, relational analysis encompassing imaging strategies for cross-case analysis suitable for case-studies.

Thematic analysis is the most familiar type of analysis and is appropriate when searching for models and themes in qualitative case studies. A thematic approach was adopted to report the findings of this study. A theme is a concept or theory that emerges from data (McWhorter & Ellinger, 2018:193). In this study, verbatim accounts were the primary data collected. Data collected through interviews and lesson observations was be transcribed and analysed qualitatively by the researcher himself. The components were then be coded and arranged into themes following Tesch's (1990) method, which provides a detailed guideline to develop an organising system for unstructured qualitative data. The Tesch method is a coding process involving eight steps and entails breaking down, comparing and examining the transcribed interviews. Tesch's eight steps and what was done in line with the steps are explained in Chapter Four. The findings of the study were presented in narrative format.

1.8 MEASURES FOR TRUSTWORTHINESS

Trustworthiness is a vital concept in qualitative research. Trustworthiness permits a researcher to explain the qualities of qualitative research outside of the restrictions that are typically applied in quantitative research. The criteria for rigour in qualitative research are trustworthiness and authenticity (Lincoln & Guba, 1985).

The collection of data for this study followed a plan intended to guarantee rigour throughout the process of data gathering, analysis and writing up the findings of the study. Qualitative researchers have come up with strategies to make sure there is rigour in their work. The strategies are based on the different world views and different questions which are congruent with the constructivist philosophical assumptions underlying qualitative research (Given & Winkler, 2014:8; Merriam &Grenier, 2019:16). In a landmark work that remains highly influential among qualitative researchers, Lincoln and Guba (1985) developed the notion of 'trustworthiness' and a range of standards that mark rigour in qualitative research. The terminology used by Lincoln and Guba still remains viable (Merriam & Grenier, 2019:17).

Lincoln and Guba (1985) introduced new terms such as credibility, transferability, dependability, conformability and reflexibility in place of terms such as validity, and reliability which are used to denote rigour in quantitative research (Given & Winkler, 2014:8-9).Trustworthiness is the way in which qualitative researchers make certain that transferability, credibility, and confirmability are evident in the study (Maxwell, 2019:12). The intention of trustworthiness in qualitative research is to show that the inquiry's findings were conducted in a rigorous, systematic, and ethical manner, such that the results can be trusted, and applied to practice (Merriam & Grenier, 2019:24). Trustworthiness in this study was ensured by using various criteria which are examined in more detail in Chapter 4.

1.9 ETHICAL CONSIDERATIONS

Adherence to ethical conduct is an essential responsibility in qualitative research. Ethics are in essence about how well researchers treat study participants. Researchers must put the observance of ethics at the centre throughout the research. Qualitative researchers make contact with human participants in the field and that means ethical problems are often encountered (Silverman, 2010:152). Good ethical conduct means developing ethical principles that are sensitive to the interests of the participants in decision-making. Good ethical conduct also means being able to predict what might arise, reacting to the unexpected and working in a considerate and thoughtful way (Webster, Lewis & Brown, 2014:78).

Flagrant abuse of research participants in the name of science has led many universities to establish codes of research ethics. There is a wide agreement among researchers about what ethical research entails. In this study ethical concerns will be guided by the UNISA Policy on Research Ethics (2016).This section explains key ethical codes that have been developed and how they acted as guidelines in the context of the research.

The following key principles guide the research:

Access to the field: Entrance to a research location should be discussed with pertinent gatekeepers (Punch & Oancea, 2014:65). Admittance for this research was obtained from the Ministry of Higher and Tertiary Education, Science and Technological Development (MHTESTD) and the Ministry of Primary and Secondary Education (MPSE). The researcher sought for written permission from the MPSE to go into the schools where the student teachers were doing their practicums (Appendix E). The researcher also sought for permission to work with the student teachers from the MHTESTD (Appendix B). The

researcher sought for written permission from the college principal to work with the student teachers on teaching practicums (Appendix D). After the completion of the study the researcher gave the schools, the pertinent teachers' college and the relevant ministries copies of the findings. The relevant authorities were be assured of the safe storage of all names and other recognising information (Appendix G).

Informed consent: Consent is a key element of human integrity. The need to obtain participants' informed consent is stated by most guidelines. Free and informed consent necessitates that prospective participants be completely informed of the research objectives and of the consequences of their participation so that they make an informed choice on their proposed participation. It also requires that they confirm that they understand the agreement and are willing to participate (Silverman, 2010:155; Gaudet & Robert, 2018:132). Research staff and participants were fully informed about the rationale of the study and their role, methods and the planned uses of the research, what their contribution in the research brings about and what dangers, if any, are involved (Appendix G).The research participants were made to sign a form of consent(Appendix H). The form was designed in a way that allows potential participants to make an informed decision as to their involvement in the study and to document their decision to take part. The consent form signed by the student teachers details the protection of their identities

Privacy, Anonymity and Confidentiality: Anonymity is also a key element of human integrity. Respect for privacy is critical to the conduct of ethical research with human participants. The anonymity and interests of the participants must be protected. It is widely agreed among researchers that all participants have an intrinsic right to privacy (Denscombe, 2007:143;Ary *et al.,* 2010:595;Gaudet & Robert, 2018:127). Participants must be protected from the danger that the information they furnish throughout a study could be given to outsiders where it might have harmful consequences (Ary *et al.,* 2010:597). Confidentiality and anonymity are the two aspects that deal with privacy. Confidentiality means keeping the information acquired from an individual during a study confidential and private (Ary *et al.,* 2010:597). In this study, all information obtained was treated as confidential. The participants were informed of the confidentiality with which their information was going to be treated. The information was used for the purposes mentioned only. The researcher provided secure storage for information with regards to the names of individuals and other identifying

information. If the data was to be made accessible to third parties, the researcher ensured that all identifying information to the data would be removed (Appendix G).

Protective measures for participants: Research studies pose physical, psychological, legal and economic harm to participants. An awareness of all types of harm that research can cause is necessary so as to work and minimise them at all times. Researchers became alarmed with the treatment of research participants after exposure of infringement of critical human rights in the name of science (Neuman, 2014:147). The privacy of participants was protected by handling the data they provided in a way that ensured that it was not associated with them personally. Anonymity means protecting the identity of particular participants (Ary *et al.*, 2010:597). No distinctively recognisable information was attached to the data so that no one could identify the participants through the data they provided. Participants were given pseudonyms in order to protect their identity.

Freedom to withdraw: Participants must never be coerced to take part in a research. Consent is valid if it is freely given (Silverman, 2010:155). As a lecturer at the college where the participants were drawn from, his position of authority might have made some participants feel obliged to participate. The participants were not coerced into participating. Participants participated in a voluntary way. They were assured of their right to withdraw, without any penalty, from participating at any given time should they have felt that they no longer wished to contribute anything (Appendix G).

Feedback: Feedback informs the organisation of the research course and in so doing, gives stepping stones along the way. Research participants were given the opportunity to receive the findings of the study. Each transcript was given back to the participants to peruse and edit. Narratives were also given back to the participants for their comments and potential editing. Participants were given the latitude to append or remove text as they wished. Participants were informed of the intention to publish the findings of the study as a thesis and as journal articles.

1.10 DEFINITION OF KEY TERMS

To give a better understanding of the study, operational meanings of key terms are provided in this part of the chapter.

Constructivism

Constructivism is an epistemology and is also a learning theory. As an epistemology constructivism suggests that reality is fluid and knowledge about this fluidity is possible through discourse, social scripts and visual symbolism. Constructivist epistemology suggests that knowledge is a construction of the learner. It is not intrinsic, or passively absorbed. As a learning theory, constructivism suggests active participation by the learner. Constructivism suggests that learners should subjectively construct, interpret and reorganise their knowledge. Learners must discover, discuss and interpret knowledge to make it their own. This implies that the learning situation should be organised to help learners construct and implement their own theories. Learners must reflect on gained knowledge and skills. Learners should be made responsible for their own learning (Cirik, Colak & Kaya, 2015:31).

Learning

Learning is a somewhat enduring influence on behaviour, knowledge, and thinking skills that results from experience. Schunk (2012:2) defines learning as acquirement and modification of "knowledge, skills, strategies, beliefs, attitudes and behaviours". Learning is a permanent change of behaviour based on experience. The objectives of learning are to develop specific insight, skills or capability in learners during a lesson (Santrock, 2011:217).

Teaching

According to Galton (2007:38), "Teaching is an interpersonal, interactive activity typically involving verbal communication, which is undertaken for the purpose of helping one or more students learn or change the ways in which they can or will behave". Teaching involves giving lessons to learners in an institution of learning. Teaching means interaction of teacher and learner. Teaching involves helping learners find information, remember it, understand it, organise it, apply it, evaluate it and do creative things with it. Teachers facilitate learners' learning at school or in any another environment outside the classroom (Killen, 2019:8).

Student teacher

A student teacher is a student who is going through professional education and preparation in a teacher education programme. He or she has not yet graduated from a teacher education programme and has not yet started a professional career.

Perception

Perceptions are people's interpretations of reality. Perception is understanding, grasp or an alertness of something. Perception is the way something is viewed, construed or taken to mean. Perceptions are opinions from which things are experienced or considered. Perceptions relate to the way people try to understand the world around them and concerns people's understanding and attitudes about the world (Bernhardt, 2015:14).

1.11 CHAPTER DIVISION

The thesis consists of six chapters which are organised as follows:

Chapter One is an introduction which gave the direction of the study. The chapter outlined the choice of the topic and the reasons for engaging in the study. The chapter also offered literature overview of the concept of learning and constructivist theory. In addition, the chapter summarised the research design and methodology and discussed measures for trustworthiness ethical issues governing the research. The chapter ended with key concepts being presented and discussed.

Chapter Two discusses the concept of learning. Traditional approaches to learning are underpinned by behaviourist and cognitivist theories of learning which are also discussed in the chapter.

Chapter Three discusses the concept of constructivism and its application in the classroom. The major constructivist theorists are also discussed in the chapter. The New Approach in the Zimbabwean context will be part of the discussion.

Chapter Four describes the research questions, research design and methodologies that will be used in carrying out the research. Data analysis procedures will be explained.

Chapter Five presents the data analysis and interpretations of findings and their integration with the literature. The findings of the empirical research are presented and discussed in light of the constructivist theory.

Chapter Six summarises the findings, offers recommendations and discusses implications of the study. The study's limitations and its contributions will be highlighted.

1.12 SUMMARY

The chapter provides an introduction to the study. The topic of the study, namely the perceptions of the student teachers' regarding the practical application of constructivism in instruction, was introduced. The concept of learning was reviewed as well as the theories that explain learning. The chapter explained briefly the concept of constructivism and the theories that underpin constructivism. There was also a brief discussion of the research questions and methodology that will be used in the study. Measures for trustworthiness as well as ethical considerations that govern the research were also briefly discussed. Key terms used in the research were also explained. A summary of how the chapters in the study are divided ended the chapter. Chapter Two discusses the concept of learning in greater detail.

CHAPTER TWO

TEACHING AND LEARNING THEORIES: TRADITIONAL APPROACHES

It is little short of a miracle that modern methods of instruction have not already completely strangled the holy curiosity of inquiry, because what this delicate little plant needs most, apart from initial stimulation, is freedom; without that it is surely destroyed. Albert Einstein

2.1 INTRODUCTION

Teaching and learning complement each other in the acquisition of knowledge, values, traditions, skills and behaviours. Good teaching makes good learning happen. There is a conceptual connection between the two processes in the sense that if something has been successfully taught then something has been learned. Teaching involves imparting knowledge whereas learning involves acquiring knowledge. The teacher is someone who opens the world to the learner and opens the learner to the world. The two practices are at the two ends of the knowledge acquisition course of action.

In Zimbabwe, teaching and learning practices are largely influenced by traditional approaches which tend to be largely teacher-centred models. Teacher-centred models of teaching are rooted in points of view that grew out of behavioural and cognitivist theories of learning (Arends, 2012:355). In this chapter, the concept of teaching and learning and the behaviourist, cognitivist and information processing theories of learning are examined.

2.2 CONCEPT CLARIFICATION

As in the previous concept clarification section, this section gives a deeper understanding to operational meanings of key terms.

2.2.1 Learning

Learning is a complex, elaborate and rapid process. Learning has its roots in the evolutionary utility of adapting to particular environments. It offers the flexibility that is needed to adjust and deal with particular environments. Learning involves refinement of existing behaviours and in-depth learning can take this adaptation so far that new behaviours are generated. However, no such behaviours can be completely new in the sense of being unconnected to an individual's history. As adaptation builds on adaptation, a broad range of behaviours can be

created. The results of learning are dramatic with human values being developed and maintained.

Learning in the industrialised society is now done in a largely technological backdrop characterised by the increasing use of digital media. The present technologically-loaded learning ecology is distinguished by the unrelenting utilisation of digital media, its assimilation into official frameworks, and a move towards personalisation of learning. In informal settings, personal mobile devices, social media and easy access to the media are changing the learning landscape. In the schools, learners are assuming greater responsibilities for their own learning. They are creating their own learning and dialoguing places online outside the backing of the school, making use of new technologies and personal tools to support each other (Wheeler & Gerver, 2015).

Current reform efforts show the potential of improving human capacity to learn. The nature of learners and the expectations for teachers are changing. Technological advances have provided greater access to information and jobs. Information has become global and instantaneous with worldwide internet access making services and products available to just about anyone, anywhere, and events in one place on the globe affect not only that place, but every other place as well (Ertmer & Newby, 2013:44; Killen, 2019:38).

It is difficult to give a universally accepted definition of learning because there is little consensus among theorists on what learning entails. Learning has been defined from different angles by different people. Learning has been generally conceived as getting more information, memorising and replicating, thoughtfulness, viewing something in a special way, and altering as a person. All the different conceptions relate to what the learner is doing (Carnell & Lodge, 2012). Certain common elements are evident in these conceptions of learning such as seeing learning as meaning to bring about changes in the behaviour of an individual. Many psychologists appear to agree with the definition for learning given by Schunk. Schunk (2012:3) defines learning as "… enduring changes in behaviour or in the capacity to behave in a given or other forms of experience". The definition emphasises change of behaviour through experience, permanence of the change, and its endurance. Learning will have taken place when individuals become competent in doing something in a different way. A key criterion of learning is permanence with learning creating a permanent change in behaviour. Changes do not count as learning if they are temporary; the change has to last (Seifert & Sutton, 2009:20). This excludes temporary changes in behaviour brought

about by drugs, alcohol abuse, and fatigue where behaviour returns to its original state with the removal of the cause (Schunk, 2012:4). Learning takes place through experience such as in practice and in observing others. Learning through experience rules out behavioural changes that are determined by heredity, such as changes which come through maturation like crawling and standing in children. The difference between maturation and learning may not be clear cut. People may be genetically disposed to behave in certain ways, but the genuine growth of the particular behaviour depends on the milieu (Schunk, 2012:4).Learning is thus a process that effects changes in the mind of an individual. Learning is the acquisition or modification of knowledge. The individual is involved in increasing information about a thing or a phenomenon. However, learning can be very passive as when it happens simply by virtue of something happening to a learner. Learning, however, frequently requires that the learner does something physical or something mental, or ideally, both physical and mental (Ormrod, 2016:20). Regardless of how learning is defined, learning can be said to have occurred only when it can be observed or reflected in a person's behaviour. Learning is a construct, that is, an idea or representation that cannot be openly observed but which is inferred from the behaviour of an individual. Learning is active and transformative (Badie, 2016:292) with transformation referring to change brought about in the learner which is more or less radical and deep in form, nature or appearance (UNESCO, 2019:2).

Learning is an essential process for human survival because human beings rely on deliberate learning efforts for the acquisition of most of their behaviours. Very little of human behaviour is instinctive. The capacity to acquire a large body of information and diverse behaviours allows human beings a bigger measure of elasticity and compliance compared to other species (Ormrod, 2016:18). Human beings can determine actions which lead to successful results and change their behaviours accordingly. As the wisdom gained from one generation and from experience is passed on to children, each generation becomes capable of shedding greater light on personally produced comprehensions and understandings. The surroundings in which humans live have an enormous effect on the understanding and skills they do and do not acquire. Human beings are flexible and can adjust to many diverse circumstances and milieu (Ormrod, 2016:27).

Learning is important because it provides a guide for tomorrow's actions. In modern day societies, learners must be equipped for a rapidly changing world. The United Nations Educational, Scientific and Cultural Organisation (UNESCO)(1996) report gives different

reasons why everyone needs to learn. The report is considered to be a key reference for the conceptualisation of education and learning worldwide. The report, compiled by the International Commission on Education (ICE), gives four pillars of the need to learn by everyone. These are learning to know, learning to do, learning to live together and learning to be. The Partnership for twenty-first century (P21, 2009) also came up with a well-planned outline of skills, which are widely acknowledged because of their thematic relevancy for the twenty-first century (Anagun, 2018:826).

Education systems are recommended to integrate "twenty-first century" skills as a central part of their curriculum. Adoption of the framework of skills may enable schools to develop in learners the knowledge, skills and uniqueness that will lead them to become thriving, economically creative, and keenly occupied learners (Anagun, 2018:826). The framework is a general reference point to the skills needed by learners to deal with the reality and circumstances of the twenty-first century. The skills differ from those of the previous century because they focus on technology, digital work and in general, on the significance and purpose of knowledge. The framework encompasses fundamental proficiencies like critical thinking, problem solving, creativity, communication, collaboration, innovation, teamwork, decision making, leadership, knowledge application, self-direction and learning how to learn.

These skills are categorised into three skill sets namely learning and innovation, life and career skills and media and technology skills (P21, 2009). The P21 classifies each set of skills with particular key competences. Learning and innovation abilities consist of competences for engaging in critical thinking and problem-solving, communicating, collaboration, and being imaginative and innovative. The abilities are centred on fostering the 4Cs or creativity, critical thinking, communication and collaboration. The 4Cs are indispensable in preparing learners for a more multifaceted life and work experience. Learning and innovation skills align with the second pillar of the International Commission on Education (ICE). The second pillar has a bearing on how young learners learn in schools. Learning to do has been synonymous with vocational education and has been considered for those who are less able. In today's world, it has become difficult to foresee what young people will need to learn to do. Learners should not respond to changes that have already occurred. They need to develop the skills for self-directed learning and it is important that learners acquire the skills and capacity to be flexible and to learn to work with others (Carnell & Lodge, 2009:9).

Digital literacies cover information, media and technology. Information literacy is the ability to recognise when information is required and containing the capacity to find, assess and successfully utilise the needed information. Media literacy is the capacity to decipher, assess, analyse, and generate print and electronic media. Technology literacy is the capacity to use digital technology, communication tools and/or networks to reach, handle, incorporate, assess and generate information. In the twenty-first century, effective workers and citizens should be able to have a wide variety of aptitudes connected to information, media and technology. This is in line with the second pillar of the ICE report, which points out that people require to learn how to learn because of the continuous rise in the escalating amount of knowledge and proficiencies found in the twenty-first century. More information than ever before is available in today's world. The information base is rising swiftly and doubles every four years (Carnell & Lodge, 2009:9). People have to know how to locate and decide on pertinent information, process it, convert it and use it. Societies are now organised around the processing of information. Learners should be able to deal with this increase in knowledge to be effective (Watkins, Carnell & Lodge, 2007:18). Change is a continuous state so the capacity to learn and to adapt needs to be a lifelong process. In a modern society, the capacity to transfer learning and to generate more knowledge is more significant for employment prospects than the amassing of qualifications. Employers now require people who are able to add more knowledge and to transfer knowledge and to function collaboratively. People should learn in a variety of contexts and not just in formal contexts, like school. Learning is increasingly taking place in different settings. Learning has become a way of being (Watkins *et al.*, 2007:18; Carnell & Lodge, 2009:9-10). People should learn to learn. The UNESCO (2010) report argues that it is not enough to supply children with a store of knowledge which they can draw from in future. Traditionally learning that takes place in school has been characterised with the learning of content but amassing information is not the same as learning to learn. In the modern world, the volume of information accessible to everyone is always growing and the form of the knowledge is changing. Everyone needs to know how to handle this exceptional situation. Young learners should learn how to locate, assess, arrange, construe and tie up the information accessible to them (Carnell & Lodge, 2009:9).

Life and professional skills consist of the capacity to be flexible and adaptable, to have self-direction, to engage in communal and cross-cultural exchanges, to be creative and responsible, and have the likelihood to supervise management and tasks (Anagun, 2018:826). This set of skills aligns with the third and fourth pillar of the ICE report. The third pillar

argues that the preoccupation of schools of the importance of proving that knowledge has been obtained makes it difficult to promote the notion of living collectively. Education today is concerned with developing in people the ability to live together. Technological changes bring about the need for people to know how to relate to each other in many roles using many different media in their social worlds. Learning to be, the fourth pillar in the UNESCO report sums up the other three pillars and has to do with the growth of the total child. It is a holistic approach to learning. The UNESCO report posits that "[i]n that connection, education must not disregard any aspect of a person's potential: memory, reasoning, aesthetic sense, physical capabilities and communication skills" (UNESCO, 2010:97)

The skills outlined by the P21 are necessary to ensure that learners are equipped with the relevant skills to function effectively in the 21st century. Curriculum instruction and learning settings are supposed to be aligned to ensure that the education system equips learners to function in the 21st century. Twenty-first century skills are general and implicit in nature. Their growth requires a coordinated and consistent learning environment (Anagun, 2018:827). The UNESCO report urges that the four pillars of the ICE should be attended to throughout life so as to equip learners with the ability to meet the demands of a complex and changing future (Carnell & Lodge, 2009:10). The pillars are developed by shifting the focus from teaching to focus on learning and from teacher responsibility to learner responsibility.

Learners are now being prepared for a world of work that is yet to be invented. When learners leave school and enter into the yet-to-be invented world, they will need to be equipped with a range of skills and literacies. Learners need to be agile thinkers in order to be able to solve problems that are exclusive to their generation. People now need to be flexible and responsive to change and to have skills of learning as well as knowing how to learn in order to survive. Learners will have to be generationally ready and technologically literate, probably beyond the experience and knowledge of their teachers. It may not be possible for learners to learn these skills solely at school; they will have to discover new ways to learn these for themselves. It follows that if schools are to contribute towards this development, teachers need have new pedagogies to support these new ways of learning. This means a radical change in the way education is conducted. It also means new theories should be applied to explain and underpin the practices that will emerge to meet new expectations and new ways of learning if education is to be saved. There is need for a new vision to preserve

that which is good and great about education as it is not sensible and sustainable to continue applying old methods of learning (Wheeler& Gerver, 2015).

2.2.2 Teaching

Teaching is a complex and challenging profession. It is an art and a science as well as a talent, supported by experience and insight of practice. Some aspects of teaching cannot be regulated or directed by scientific knowledge only but depend on alternative sets of complex individual conclusions based on individual know-how (Arends, 2012:4; Killen, 2019:38). The primary objective of teaching in schools is to bring certain desirable change to the behaviour of learners through the process of learning (Nations, 2007:355). The ultimate intention of teaching is to assist learners to become independent and self-regulated. The intention does not cancel out other intentions of education but instead serves as the most important goal on which all other goals and teacher activities are premised (Arends, 2012:20). The intended change could be extensive, such as mounting a whole new conceptual outline, or it may be particular and easily facilitated (Watts & Jolifi, 2015:174).

Teachers are indispensable regardless of new developments that facilitate the learning process. The success or failure to accomplish superior learning lies chiefly in the hands of the classroom teacher. Teachers lead by example for learners to succeed. Teachers help learners build up their individuality and leisure activities to become competent citizens for the future. This makes teachers an important school-based factor in facilitating learner-achievement. Teachers scaffold learners in their discovery of knowledge where they keep it in the mind, comprehend it, organise it, relate it, assess it and do innovative things with it (Killen, 2019:38). Good teachers constantly update their own knowledge and skills, reflect on their practice, and view their work critically and objectively. Teaching in the twenty-first century requires teachers to constantly furnish themselves with the knowledge and skills needed to enhance learning in the schools. The essence of good teaching is to get learners to fall in love with learning (Praditya *et al.*, 2018:172).

Teaching practices are in need of reform but teaching as a profession has a long conservative history. Teaching practices are full of contradictory and outdated practices that do not translate into learning in the real world. The factory model of teaching persists but it is not the most suitable way to train the workforce of the future. Schools still rely on a mechanistic approach to learning which depend on methods of verification and replication. Knowledge is looked upon as something to be conveyed rather than something that can be discovered and

discussed. Teachers control the learning process and give little autonomy for imagination, self-direction and investigation. The teaching strategies are a one-size-fits-all approach where the individual learner is swallowed up in the machinery of the school day. The learning experiences to many are uniform and standardised (Jukes & Schaaf, 2019:12).

Teachers are qualified academics and professionals who strive on building up and strengthening their learners' innovativeness. The professional competence of teachers is a significant factor in bringing about an improvement in the quality of education. Teachers rely on theories to inform and justify their professional practice as teachers. Theories explain the learning process and help teachers understand learner's behaviour from a particular perspective. The theoretical models learned by teachers and the skills acquired by teachers, are inextricably linked. They influence each other and become part of the teacher's characteristic as an educator. The theoretical explanation holds sway over what teachers do and practice in the classroom. The two cannot be separated. The subject knowledge attained through psychology of education enables the teacher to know the process of remembering. The teacher is able to help learners to remember and transfer skills acquired in the classroom to real life situations outside the school. Theories, however, fall in and out of favour. Most traditional theories of learning were created before the advent of digital technology. The theories are helpful in clarifying what learning was like in the past. They also explain what is seen in most schools today. The relevancy of traditional theories of learning is now being questioned because of the changing nature of learning and the rapid technological changes being experienced in the world. The world of learning now calls for a more democratic, more participatory and more collaborative process of learning (Watts & Jolifi, 2015:173; Killen, 2019:39).

Teachers play a critical role in the implementation of new approaches to learning. The success of educational reforms depends heavily on the teacher's capacity and beliefs. The teacher creates the effective learning environment that helps learners to engage in and take responsibility for their own learning. Modern day teachers face the challenge of adapting teaching methods to the demands of the twenty-first century, necessitating a move away from traditional methods of instruction to learner-centred methods. The move into the information age requires that teaching and schools change, and teachers thus need to transform pedagogy to meet the requirements of a different learner population. The teacher's beliefs are an important factor in the adoption of constructivist approaches to learning in the schools.

Beliefs and behaviours work collaboratively but beliefs have a more powerful effect on the teacher's classroom practices. Learning in the information age world is easier for learners but teaching is more difficult and complex for teachers (Arends, 2012:8). Today's learners have relatively easy access to information unknown by earlier generations (Wheeler & Gerver, 2015; Anagun, 2018:827).

2.2.3 Teacher Educators, Student Teachers and Teaching Practicums

Education is a purposeful endeavour set to realise preferred intentions. One of education's intentions is to develop the worth of human resources. Teachers are required to guide the process. In order to improve and maintain teachers' teaching skills, training in teaching skills and supervision of teaching activities should be carried out. Teacher training is done in teacher education institutions and supervision of teaching is done in schools to evaluate and manage student teachers' progress (Praditya *et al.*, 2018:172).

In teacher education institutions, teacher educators focus on student teachers' training. To complete a three-year diploma in an education training programme, student teachers are required to do a professional foundations course, theory of education and teaching practicum which helps student teachers attain and build up focused, scientific knowledge in advance. Teacher training involves building up proficiency in lesson planning, visualising, class control, critical thinking, decision making and problem solving. Such knowledge helps student teachers to build up their own potential and equips them with the necessary skills to carry out their prospective responsibilities as teachers (Wambugu, Barmao & Ng'eno, 2013:170).

Learning to teach entails spending some time doing field experience in schools for varying periods of time. Pre-service teacher training programmes are more comprehensive when there is an effective practicum programme which places student teachers in the field where they are required to face and take responsibility for the various situations connected to the classroom (Chen & Mu, 2010:128). A teacher needs to practise beforehand using the skills concerned with teaching before teaching in the actual classroom context. This means that a teacher needs to exhibit his or her understanding of pedagogy and subject material prior to certification. A Diploma in Education course in Zimbabwe requires student teachers to practise teaching skills in a real classroom situation for a period of three school terms. Teaching practicums to develop student teachers' perceptions concerning their roles and responsibilities as professional teachers are a critical step in learning to be an effective

teacher. Teaching practicums provide student teachers with a chance to put into practice the theories that they have learned in their course, the various skills developed, and behaviours learnt before starting to work as professionals (Bhargara & Pathy, 2011:80). The practicums help to develop confidence in teaching. In addition, student teachers are given the opportunity to experience and learn about learners' behaviour, assess their knowledge of subject matter, get constructive criticism, ascertain teaching strengths and weaknesses and build up a professional base from which to work.

Student teachers on teaching practicums work with mentor teachers. The mentors assist student teachers by modelling lessons, observing them teaching, and showing them how to do the required paperwork such as lesson planning, scheming and calling out class registers. During practicums, student teachers practice lesson planning, carry out teaching activities and evaluate their learners. A good student teacher is one who, during practicums takes the opportunity to practises and demonstrates various teaching abilities and behaviours (Wambugu *et al.,* 2013:170). Student teachers are expected to have a grasp of a range of knowledge bases such as lesson planning and lesson delivery as well as developing the skill of being reflective, problem solving professionals. In addition, a deep understanding of the subject matter is vital because it gives a good basis for subject knowledge and allows the student teacher to make his or her ideas available to the learners. Student teachers receive feedback from varied sources regarding their activities in the cooperating schools. The school heads orient, observe and evaluate student teachers. The student teachers also receive feedback from other experienced teachers, mentors and supervisors from the college and other student teachers who might be in the same school.

Teaching and learning in the schools is influenced by two camps, namely traditional approaches and constructivist practices. As previously indicated, traditional approaches still dominate in many classrooms, but they are increasingly being challenged in terms of their ability to prepare learners to meet the needs of the modern world. The two camps differ in their teaching methods, classroom running procedures, curriculum standards, official lesson plans and assessment procedures. Most experienced teachers still use traditional approaches in their classrooms and in Zimbabwe, not much has been done to make them change their teaching approaches. Student teachers on the other hand are receiving tuition in the use of constructivist practices at teachers' colleges and as a result, the assessment of student

teachers is based on their application of constructivist practices. The two approaches are to be examined in the sections below.

2.3 TRADITIONAL APPROACHES

Traditional approaches, underpinned by the behaviourist and cognitivist learning theories (Uden & Beaumont, 2006:2), are methods of instruction customarily used in education. Traditional approaches emanate from the philosophy of positivism. In traditional approaches, the determination of valid knowledge, appropriate inquiry methodology and effective knowledge acquisition is grounded in the traditions of Cartesian dualism, empiricism, and positivism (Horn, 2007:439). The positivist approach has a firm foothold in scientific psychology. Positivism is traced back to the works of Enlightenment thinkers such as Renes Descartes, Francis Bacon, John Locke, Isaac Newton and others. These rationalistic traditions promote the assumption that physical and human phenomena can be objectively studied and manipulated with a degree of certainty when rational thinking and science are used to uncover the causes and effects that underlie them (Tabulawa, 2015:10).

The philosophical orientations of both behaviourists and cognitivists are principally objectivist. Objectivists hold that there is an objective world out there which people recognise more or less precisely through their senses. Objectivists believe in the existence of an objective and reliable set of facts, principles and theories that have been discovered and delineated or will be discovered in the future (Bates, 2015). Traditional approaches see knowledge as finite and limited, with schools being preoccupied with transmitting valued, traditionally tried and tested knowledge through memorisation and reproduction. Traditional methods are concerned with the transmission of knowledge. Didactic teaching methods that acknowledge prescriptions and autocratic authority are used. Teaching methods and textbooks must be authoritative, informative, organised, and clear. Those in authority in education are the experts who qualify to make decisions about what all people should know and do and are by that token qualified to decide how to turn policies derived from the principle into practice. Such people include teachers, headmasters and subject specialists and qualify as protectors of the society's culture. They have the insight which qualifies them to detect what is required in educational institutions. The classroom teacher transmits the curriculum to the learners which is heavily influenced by external forces such as administrators, textbooks manufacturers, and national requirements (Jordan *et al.*, 2008:30).

Traditionalists believe that what is to be learnt is known and they thus seek to implement a common curriculum for everyone. Instruction in a traditional classroom is dominated by teacher-centred and subject driven approaches. Learning consists of transferring information from outside to within the learner. Learners are helped to accurately understand and function inside the real world (Uden & Beaumont, 2006:10). Learners are expected to accurately comprehend, and reproduce the knowledge that has been handed down to them. Traditionalists produce a transmission or reception model of learning where the teacher plays a distinct role in front of a confined audience. Their aim is to help learners to learn essential but agreed upon, declarative knowledge and abilities. In the classroom the teacher is the source of knowledge and learners are receptacles of knowledge. The traditional teacher is very much in control of what and how much learners learn. The teacher chooses what is important to learn, the sequence, the learning activities and how to assess learners. The teacher, sets the objectives of instruction, directs and leads the instruction following structured lesson plans, maintaining a directed and somewhat structured classroom learning atmosphere (Arends, 2012:355). The teacher transmits his or her thoughts and meanings to the learners through presenting information directly to learners with little thought of how the information is utilised. The learners rehearse the accepted clarification or line of argument put forward by the teacher without question (Uden & Beaumont, 2006:2). Learners are treated like empty vessels who sit passively waiting for the teacher to fill them up with information. The teaching process emphasises cognitive learning and logical, objective, abstract, sequential thinking. Traditionalists emphasise the acquisition of basic essential skills and do not address emotional and social aspects of learning (Carnell & Lodge, 2009).Learners are taught in a way that favours sitting and listening with little interaction between the teacher or between the learners themselves which offers little or no chance to discover and develop their learning (Nations, 2007:284).Teacher-talk dominates and there is major dependency on textbooks for the organisation of the curriculum.

Traditional approaches emphasise mastery learning. Information for the learners is separated into discrete components and constructed into a whole. Abilities are taught successively. Lower-level abilities are mastered ahead of high-level skills which involve evaluation, synthesis or analysis. Knowledge is often thought of as context-independent. Learners learn content which is often detached from real world cases. Learners memorise topic material with no understanding of the idea learned and information of how to transfer the knowledge to

solving actual problems. This makes it difficult for learners to develop and transfer problem solving skills to the real world (Nations, 2007:289).

Traditional approaches encourage a closed or an unchanging conception of the learner. Traditionalists see individuals as having specific mental abilities. Believing that learners' characteristics, abilities, intelligence, social background and motivation, decides how much they can learn. Learners on the other hand, believe that learning is determined by the teachers (Carnell & Lodge, 2009:12). The conceptions may be held by the learner, the teacher and the parents. Traditionalists do not believe that differences between the learners themselves can or should determine educational outcomes. They hold a picture of what an educated person should be like and the teacher's job is to select whatever form of pedagogy is deemed appropriate to bring a learner to the ideal shape of an educated person. This has led to standardisation of practices (Horn, 2007:441) where for example, traditionalists assess learners' progress using tests. Summative assessment is usually done at the end of a week, book chapter or topic and is used to report success or failure which is reported in terms of percentages and based on comparisons with other learners (Jordan *et al.,* 2008:31).

Traditional approaches do not equip learners with valuable learning skills (Tularam & Machisella, 2018:129). Rather they promote methods of instruction that do not encourage the type of learning young learners need for their future. Instead, they give a lot of the learning material to the learners in basic, out-of-context, and unrelated portions that do not encourage problem-solving or higher-level thinking. To achieve transfer of learning learners should be made to solve problems that allow them to perform abilities in situations similar to those in which the abilities will be used. Learners should learn information in a way that helps them develop a perception of its meaning or purpose so that they do not experience restricted access to it when appropriate circumstances arise (Uden & Beaumont, 2006:2). The learning situation must support the application and manipulation of knowledge in situations that are similar to the normal practices of the assignment. A gap is created when learners are told about an assignment's significance and do not understand its significance (Uden & Beaumont, 2006:2). Learners will thus not see link between the subject content areas and the content's appropriateness to real problems and significant circumstances (Mangal & Mangal, 2019:114).

In the next section, the learning theories of classical conditioning and operant conditioning on which the teaching methods and practices of the traditionalists are largely based, are discussed.

2.3.1 Behaviourist Learning Theory

Behaviourism came after the Enlightenment as a creation of the era of science. Behaviourism came about in response to the practice of introspection being experienced at that time. Its intention was to offer a more scientific approach where the world is construed in terms of outwardly observable behaviour (Gould, 2012:8). The period of Enlightenment accepted that the only human data that were helpful were experimental and quantifiable (Jarvis *et al.,* 2003:24). The theory of behaviourism was popularised by John B. Watson (1878-1958) but is predominantly based on the writings of a Russian psychologist, Ivan Pavlov (1849-1936). Other key players in the development of behaviourism were Edward Thorndike (1874-1949) and Burrhus F. Skinner (1904-1990), both American psychologists. Each one of them offered clarification on learning and development in relation to his particular theory. The individual theories are related because each theorist influenced the work of others (Arends, 2012:297; Mangal & Mangal, 2019:27).

Behaviourism which offers a simple explanation of learning is the earliest theory of learning that still remains a popular approach. Behaviourists attempt to model the study of human behaviour on the methods of the physical sciences (Bates, 2015). Behaviourists contrite their attention on those aspects of behaviour that can be directly observed and measured. The perspective focuses entirely on behaviour and hypothesises that a stimulus leads to a response (S-R). Behaviourism was very influential in education during the first half of the twentieth century (Schunk, 2012:21; Harasim, 2017:47); however, it is still relevant to teachers and educators because it can be used to explain some human behaviours (Jordan *et al.,* 2008:34). The approach is frequently introduced into initial teacher education programmes as the approach gives a reasonable and gradually technique of planning and organising lessons (Gould, 2012:25). Classroom teachers still make use of such things as grades, praise and privileges to motivate learners to develop desirable habits (Arends, 2012:144).

Behaviourists study overt behaviour instead of unobservable phenomena, thought and cognitive processes, hence the name. Behaviourists try to reduce human beings' activities, including their thinking, feelings and decisions to a level of behaviour which can be objectively observed and confirmed (Arends, 2012:298; Mangal & Mangal, 2019:28). Central

to behaviourism is the notion that certain behavioural responses become associated in a mechanistic and invariant fashion with specific stimuli. Behaviourists do not consider and do not include mental attitudes, thoughts, beliefs and feelings in their explanations of learning because they are not observable. They emphasise external events as central to directing behaviour through reinforcers (Arends, 2012:143).Learners are 'conditioned' by environmental stimulus such as rewards and punishment. The use of the word 'conditioning' connotes learning which happens to a learner in a manner that is frequently outside the power of the learner. Two types of conditioning can be identified namely classical or respondent and operant or instrumental conditioning (Jordan *et al.,* 2008)

2.3.1.1 Classical or respondent conditioning

Classical conditioning is historically the first form of behavioural learning to be studied systematically, hence the term 'classical'. It is also known as respondent conditioning because the process describes changes in response to stimuli. Classical conditioning is based on stimulus-response principles established by means of dogs by Ivan Pavlov. John Watson, who is regarded as the father of behaviourism, applied Pavlov's conditioning of dogs to human learning. Classical conditioning associates the conditioned stimulus and the unconditioned stimulus and the production of learning (Jordan *et al.,* 2008:22).Classical conditioning entails the occurrence of a normal reaction that takes place as a reaction to a particular stimulus(Pritchard, 2013:23). The process begins with an involuntary response to particular sights, sounds, or other sensations. Classical behaviourists propose that all learning obeys observable scientific laws that govern behavioural associations and patterns. A learner just reacts to external stimuli in a predetermined way (Jordan *et al.,* 2008:21).

Pavlov emphasised observation and measurement in his methodical investigation of a number of characteristics that help the scientific study of learning move forward. Pavlov is largely responsible for the idea of stimulus-response (Chapman, 2007:186). Pavlov's work forms the basis for more extensive claims about learning. Pavlov views learning as a change of behaviour (Gould, 2012:10). He experimented with food, a dog and a bell. Pavlov observed that dogs salivated when they saw food or their feeding bowl. Salivating was the behaviour or unconditioned response (UCR) and food was the unconditioned stimulus (UCS). If a bell is rung at the same time as food is presented, the bell is deemed a conditioned stimulus (CS). The dog salivates at the sound of the bell because it associates the bell with the food. Learning has taken place because the dog now exhibits a type of behaviour it had not shown

before (Gould, 2012:9). The dog will have undergone a change in behaviour, known as a conditioned response (CR). CR entails the development of a relationship between a stimulus from the environment and a response (Buckler & Castle, 2014:223). Presenting the conditioned stimulus, the bell, without associating it with the unconditioned stimulus resulted in the extinction of salivating - the CR (Pritchard, 2013:23).

Classical conditioning enlightens how neutral stimuli become linked with unlearned instinctive responses. Classical conditioning shows how people acquire diverse instinctive responses, particularly those linked to physiological functioning or the emotions. Classical conditioning can be used to explain both positive and negative behaviour of learners in the classroom. It helps teachers to understand learners' anxieties and fears. Learners can be conditioned to like school experiences if they are made to feel that the classroom is a safe and fun place. Teachers can understand that the responses learners make to a situation or object are probably a result of their association being made with a previously pleasant or unpleasant outcome. Teachers may unconsciously teach learners toward liking or disliking their subject or to fearing the classroom if the learners come to associate it with criticism. Many of people's emotional reactions are considered a consequence of classical conditioning (Gould, 2012:11). However, classical conditioning is weak in explaining deliberate behaviours in classrooms, like when a learner studies hard for a test or is fond of one subject but not the other (Jordan *et al.*, 2008:22).

2.3.1.2 Operant or instrumental conditioning

Operant conditioning is an important alternative to classical conditioning. Operant conditioning is Skinner's term while instrumental conditioning was used by Edward Thorndike. Both terms refer to the learning of behaviours that operate on or have an instrumental effect on the environment. Operant conditioning is more flexible and therefore seen as more useful. It is a form of learning in which behaviours are dependent on or are controlled by rewards and punishment (Jordan *et al.,* 2008:24). Reinforcement is based on a desired response originating from choice (Buckler & Castle, 2014:14). Behaviour is reinforced by rewarding or punishing it. Positive reinforcers are used to bring about reactions that are needed while negative reinforcers are used to stop reactions that are not needed. In the classroom, favourable comments are a form of positive reinforcement while punishment is a negative one. In some cases, simply not giving an anticipated prise for a particular behaviour is enough punishment (Pritchard, 2013:24).

Skinner is well-known in the field of operant conditioning. He proposed the idea that humans learn and act in specific behaviours as a consequence of how those behaviours are encouraged during reinforcement (Pritchard, 2013:25). Skinner developed the law of conditioning and the law of extinction. The law of conditioning states that a reaction followed by a reinforcing stimulus is made stronger and is more likely to occur again. The law of extinction states the opposite (Jarvis *et al.*, 2003:27). The bigger and more attractive the reinforcer, the quicker a response will be made. A reaction that is not followed by a reinforcing stimulus is weakened and is therefore less likely to occur again. The link between stimulus and response slowly becomes weaker and consequently goes into extinction (Jordan *et al.*, 2008:25; Arends, 2012:298).

Important features of operant conditioning are reinforcement, positive reinforcement, negative reinforcement and shaping. Shaping is a method of reinforcement used to teach learners behaviours that they have never executed before. Simple responses that the learner can easily execute are rewarded before more complex behaviours are required for the same reward. Operant conditioning, however, does not fully explain the process because it does not clarify the role of innate and cognitive factors in learning (Pritchard, 2013:26).

2.3.2 Behaviourist Learning

Behaviourism contributed many teaching and learning innovations which still dominate classroom practices today. However, educational practices that are explicitly based on behaviourism have lost their appeal.

Behavioural learning is teacher-centred and views learners as empty vessels waiting to be filled with discrete knowledge (Mangal & Mangal, 2019:316). Behaviourism promotes direct methods or models of instruction. Direct instruction or explicit instruction is based on whole-class expository teaching techniques and testing of skills which are deemed essential for mastery in a subject area. Direct instruction emphasises teaching in small steps and providing all learners with a high level of successful practice (Killen, 2019:39). Basic modes of direct instruction are lectures and demonstrations (Killen, 2019:38; Mangal & Mangal, 2019:243), which are teacher-centred and highly structured. The teacher directs the instructional process (Killen, 2019:38) resulting in overly rigid classrooms. The teacher firmly organises the learning environment and keeps a scholarly focus. The teacher expects learners to be enthusiastic observers, listeners and participants. The teacher follows specific steps that lead learners to attaining clearly defined learning results. Teacher-centred instruction encourages

the teacher to be autocratic and the learners to be passive. The teachers control learners' behaviour by employing consequences such as positive and negative reinforcement (Brown, 2007:490). Behaviourism helps learners to acquire basic skills and knowledge taught in a step-by-step fashion. The perspective encourages mastery learning which focuses on mastery of skills and factual knowledge, or mastery of procedural knowledge, and declarative knowledge (Mangal & Mangal, 2019:243). The success of learning in a behaviourist classroom depends mainly on the teacher's passion and hard work. When implemented well, behaviourist learning is effective in promoting learners' learning but when implemented poorly it can be very boring (Killen, 2019:59).

On the negative side, the needs of the learners take secondary importance and are not addressed. Inadequate attention is paid to learners' socioemotional development and intrinsic motivation is ignored as behaviourist instruction is associated with drilling, repetition and rote learning (Santrock, 2011:407). Learners are not given adequate opportunities to construct knowledge and understanding with little collaborative learning occurring in small groups (Arends, 2012:144). The behaviourist teacher relies too much on paper-and-pencil tasks and creates limited space for real-world learning.

Behaviourist instruction is a process of transmission (Gray & MacBlain, 2015:59). Behaviourist lessons generally follow a sequence of orienting learners to new educational material, lecturing, explaining and demonstrating, questioning and discussing, seatwork and homework. The lesson begins with the setting up of objectives that express with exactness the behaviours learners must learn. Objectives give learners the cues on what is going to be learned. Behaviourists use verbs or action words to state the behaviours that are going to be observed or measured. The behavioural change can be the acquisition of new information, the gaining of a new ability or the modification of an attitude. The lesson begins by reviewing the preceding day's work, discussing the objectives with the learners and providing clarity about the work to be done and getting learners ready to learn by giving an overview of the day's work. The teacher transmits information directly to the learners. During the lesson learners are given a chance for guided practice and the teacher provides feedback on learner progress (Santrock, 2011:407; Arends, 2012:305). The central act of behaviourist teaching is to control learner behaviour, equating learning with changes in the form or frequency of observable performance. Behaviourists focus on changes on the external behaviour through the use of external things such as rewards or punishment to shape the behaviours of learners. The

teacher determines what is appropriate and inappropriate behaviour. Behaviourist learning involves repeated actions, verbal reinforcement and incentives (Brown, 2007:490). The teacher elicits the desired response from the learner by presenting a specific stimulus and the learner is given opportunities to practise making the proper response. Learning is accomplished when an appropriate reaction is exhibited following the presentation of the stimulus. Over time, the reaction becomes a learned behaviour (Ertmer & Newby, 2013; Stevens-Fulbrook, 2020). Behaviourism relies on conditioning to bring about learning. Conditioning, which differs from thinking in that the learner is not involved in intellectual activity to attain the desired result, entails changing the predecessors and consequences of the targeted behaviour. The learner changes behaviour by reacting to conditions in the environment which is different from taking an active role in discovering the environment. Memory is characteristically not addressed in behaviourist learning (Duchesne & McMaugh, 2019:217).

Evaluation and assessment are considered a behaviourist tradition. Behaviourists see knowledge as existing outside the learner and that it can be objectively observed and measured. Behaviourist evaluation and assessment focuses mainly on performance tests that measure skills development rather than paper-and-pencil tests of declarative knowledge (Arends, 2012:314). Learners demonstrate or show what they have learnt as a measurement of the quality and extent of the learning that would have taken place (Uden & Beaumont, 2006:5; Duchesne & McMaugh, 2019:217).The behaviourists assess knowledge using an objective test, which consists of a variety of different types of questions or items whose common characteristic is that they have only one answer (Gould, 2012:33). Tests rely on memorisation, repetition and regurgitation of knowledge and rarely call for analysis. Learners are trained to know the answers and not how to find the answers.

Behaviourist teachers attach great importance to planning and managing of time. The teacher makes sure that there is sufficient time to match the aptitudes and abilities of the learners in the class. The teacher also motivates learners to stay busy throughout the lesson (Arends, 2012:303). Behaviourists pay particular attention to the planning and management of learning space, preferring traditional horizontal-row desk or row-and-column desk formation sitting arrangement. In a horizontal-row desk arrangement, learners sit near each other in a fewer number of rows. The horizontal formation is helpful in carrying out demonstrations where it is important for learners to see what is going on close to the teacher. The row-and-column is a

traditional way of organising classroom space. The arrangement is suited to conditions where learners are required to focus attention on the teacher or on the information displayed on the chalkboard, or electronic projection devices. The row-and-column and the horizontal-row arrangement are however, not conducive to learner-centred approaches that depend on learner-to-learner interaction (Arends, 2012:304).

Behaviourism brought in some distinct advantages to classroom teaching such as clarity in curriculum planning, and precision in teaching and learning processes. The precision and shift of emphasis allow for more accurate and exacting assessment processes. This is an important consideration at a time of increased accountability in education. The scientific approach of the behaviourists leads easily to a systematic approach to planning (Gould, 2012:42). Many of the ideas emanating from behaviourism are increasingly in disrepute among reformers. The behavioural view of learning is critiqued for being outdated, pedantic or insufficiently considerate of learners' needs. Reformers believe that some of the practices emanating from the behavioural learning theory are the source of many problems that schools face today. Behaviourism's main limitation is its lack of attention to cognitive processes such as thinking, imagining, conceptualisation, problem-solving, and reasoning. Behaviourism is more concerned with the teacher and instructional materials than with the learner (Uden & Beaumont, 2006:5; Harasim, 2017:49;).

Behaviourist instruction is decontextualised and leads to independent possession of knowledge by learners. The concepts acquired are intangible, independent and discrete from the context (Hajian, 2019:98). The acquisition of abstract knowledge creates a situation which is similar to that of a person having quality tools but unable to use them. Behaviourist learning does not guarantee that knowledge is transferable which is really at the heart of education today and is fundamental to all learning. Learners should be able to transfer their knowledge or skills to real-life situations (Hajian, 2019:94). Transfer of learning is the creative application of prior learning and experiences in new contexts that are potentially different from the original one in which the learning had taken place (www.nwlink.com). Transfer of learning can be enhanced through coaching, scaffolding, interacting, assessing and reflecting in situated learning environments (Hajian, 2019:94). It demands time for exploration, discovery, flexible adaptation of skills, and asking questions such as what principles need to be applied and how the final outcomes need to be assessed (Hajian, 2019:95-96). Learners will not be able to transfer learning if there is no relationship between

the material taught at school and the demands of real-life skills. Classrooms should reflect life situations and give learners an opportunity to involve themselves flexibly in different learning activities and in different social contexts. Behaviourism creates a gap between knowing and doing which frustrates learners and prevents them from using their knowledge within a suitable context. Teacher-centred instructions faces limitations in helping learners to become problem-solvers and critical thinkers and it does not equip learners with the knowledge and skills necessary to function effectively as adults.

Behaviourism is criticised for the style of teaching it encourages and for its failure to explain many different aspects of learning. Behaviourism is restricted to teaching essential abilities and low-level information which learners must master but may not be useful for achieving higher-level objectives (Mangal & Mangal, 2019:316). Some features of behavioural principles and their application in certain conditions are contentious. Behaviourist principles of learning are a consequence of a strong history of research and experimentation, often with animals (Duchesne & McMaugh, 2019:220). Behaviourists discount any independent activities of the mind and assume that the internal mental life of the learner is irrelevant to learning which is an assumption very few teachers are prepared to accept.

In the 1960s, conceptualisations of learning moved away from behavioural learning models to focus on cognitive science models. Cognitivism and behaviourism share the belief that the study of learning is supposed to be objective and that learning theories should develop from the results of empirical research. The next section moves on from the theory of behaviourism and discusses the cognitivist learning theory in more detail.

2.3.3 Cognitivism as Transitional Theory Towards Constructivism

Cognitivism is seen as a transitional theory towards constructivism and in the subsequent section, cognitive and information theories and their impact on classroom learning is discussed.

2.3.3.1 Cognitive and information processing theories

Cognitive theories emerged in the mid-twentieth century as an important school of thought to explain many aspects of human activity. Cognition refers to inner mental processes and cognitive development refers to the acquisition of “knowledge in childhood” (Gray & MacBlain, 2015:4). Cognitive and information processing theories concern themselves with the way the mind works, and how the memory system affects knowledge acquisition,

movement and preservation for later retrieval. Cognitive theory gives importance to the role played by the mind in making sense of the material presented. It is an extension and reaction to behaviourist theory in that cognitivists reacted against behaviourism's rigid emphasis on the direct link between "stimulus and response"(Uden & Beaumont, 2006:6). Cognitivists argue that the link between stimulus and response is not clear-cut. Cognitive theory does not consider people as involuntary animals that merely respond to environmental stimuli (Harasim, 2017:49); in contrast, they see a number of other factors that mediate to decrease the obviousness of a response to a stimulus (Mangal & Mangal, 2019:65). Cognitivists model the mental formations and developments that work in the mind such as thinking, concept formation, reasoning and problem solving in order to explain behaviour and promote effective learning. Inferences are drawn about the nature of the internal cognitive processes that produce those responses by observing the responses of individuals to different stimulus conditions (Harasim, 2017:49; Mangal & Mangal, 2019:65).

Cognitive theories consider people to be rationale beings that learn through active participation and whose actions are a result of thinking. The cognitive approach to learning is abstract, dealing with processes that occur in the mind and are not visible or accessible through any of the senses.

2.3.3.2 Cognitivist learning theories

Cognitivism is more scientific in its explanation of learning. It puts forward a logical understanding of the process, offering a theoretical foundation for teaching practices and proposing a variety of helpful teaching approaches that support learning. Cognitivism is seen as a progressive step towards constructivism which merges cognitive methods with the element of individual and collective meaning (Jordan *et al.,* 2008:51). Cognitive theory puts forward the idea that learning takes place inside the brain and that cognitive functioning impacts which knowledge is acquired (Gonzalez du-Hess & Willems,2012). Major players in the development of cognitivism were Jean Piaget, Jerome Bruner, Robert Gagne, Lev Vygotsky and David Ausubel. Most of them, however, made the move from cognitivism to constructivism. Piaget's work in particular provided a model of cognitive development that laid the foundations for constructivism (Arends, 2012:261; Gould, 2012:46)

Cognitive learning theories include a number of different theories with diverse viewpoints and approaches. Cognitive learning theories use observations and discourse analysis to explain the development of internal cognitive processes (Gray & MacBlain, 2015:4). They

are concerned with what the learners know and how they come to acquire that knowledge. All cognitive learning theories perceive the concepts of meaning and understanding and the internalisation of the process of learning in the same way (Harasim, 2017:48). Cognitivism focuses on internal cognitive processes to understand how these processes can promote effective learning(Harasim, 2017:49).Cognitive learning theory explains the way information is received, organised, stored and retrieved by the mind. Learning is equated with discrete changes between status of knowledge rather than changes in the probability of change. The information from the environment is converted into something that can be stored within the brain's memory system (Gonzalez de-Huss & Williams, 2012). Cognitivists emphasise the process of learning and the role of the learner in mediating learning, which is an internal process rather than an automatic response to an external event and is a result of processing and reorganising new information. Learners organise knowledge and meaning by modifying mental representations (Harasim, 2017:49). Information is actively processed, and learning takes place by organising and finding the relationships that exist between different pieces of information (Gould, 2012:44). Thinking and processing of information results in behaviour change. Learning occurs as result of the learner reorganising information, either by finding new explanations or adapting old ones. This change in knowledge is stashed in memory rather than just being regarded as a modification of behaviour (Stevens-Fullbrook, 2020). The internal processes are described as mediating processes or mediators because they appear between the stimulus and the reaction. The different views on these mediators give rise to the diversity in cognitive learning theories (Gould, 2012:44).

Cognitive learning theory's different perspectives are all underpinned by the belief that all learning builds on prior experience (Harasim, 2017:49; Mangal & Mangal, 2019:65).New learning generates meaning when its related to previous learning and experience which in turn influences the interpretation placed on it. The establishment of a relationship between new and prior experience allows learners to store new learning internally as part of previous learning which is changed as result. Cognitive structures are a way of mentally storing information in categories that make relationships clear. Learning is thus a change in cognitive structures. As new bits of related information are received, the cognitive structures change in form to accommodate the new bits of information (Gould, 2012:47).Cognitive learning theories see motivation as something that is intrinsic to the learner and something which emanates from the need to find meaning. A learner achieves satisfaction when he or she establishes meaning. Motivation linked to curiosity or a need to find meaning (Gould,

2012:49)is intrinsic as the learner's needs are satisfied. Learning results when learners have an increasing consciousness of their own understanding and capability. Learners become conscious of this deeper understanding as it grows, recognising that they know more than they did before. From within the learners realise that they have learned something new and there is no need to receive feedback or reinforcement from an external source (Gould, 2012:51).

The language of the cognitivists contains many analogies and metaphors which try to make the perspective more concrete and subsequently accessible (Gould, 2012:53; Mangal & Mangal, 2019). Cognitivists make use of metaphors such as 'mind as computer' and 'information processing' when relating to educational practice.

2.3.3.3 Information processing theory

Information processing theory is an important aspect of cognitive theory. The information processing theory is internally focused, viewing the learner as a processor of knowledge or information in a similar manner to a computer (Gould, 2012:53; Harasim, 2017:49; Mangal & Mangal, 2019:65). The information processing theory, which includes the psychology of Ausubel, Anderson, repair theory and various points of view accepted by researchers in cognitive science and related psychology, is a broad field developed by numerous psychologists; however, there is no dominant theory. Information processing theory is applied to theoretical views that deal with the sequence and implementation of cognitive events. The theory, largely based on the metaphor of the mind as computer (Steffe & Gale, 2012) depicts the mind as a computer that possesses components used for processing information and procedures for using the components. The theory proffers a sequence of mental representations which involve attending to environmental events, encoding information to be learned and relating it to memory, storing it as new knowledge in memory and retrieving it when needed (Mayer, 1996:154; Schunk, 2012:164). The model dominates most cognitive learning theories. What happens in the mind is used to explain learning during the learning process, which begins when information from the environment is inputted, processed and stored in the memory and produced in the form of some learned ability. Learners develop a growing ability to process information which leads them to acquiring increasingly complex knowledge and skills. Memory is central to the whole process(Harasim, 2019:51).

The information processing theory is a reductionist theory which is illustrated by using the input-output computer analogy. The human mind is likened to a computer which acquires information at the stimulus-input point of the sensory organs, processes information through the sensory systems and components within the brain and produces a subsequent output or behaviour typically created by the motor system (Buckler & Castle, 2014:112). It is seen as having an in-built feedback loop which acts as a monitoring and safety process to provide the individual with a steady flow of information, which becomes a part of the new incoming information (Buckler & Castle, 2014:19).The computer is not a perfect analogy for the brain and cognitive activities, but nevertheless the analogy contributes to an understanding of the learner's mind as an active information processing system even though learners think in distinctively non-computer-like ways. Learners enthusiastically follow self-chosen goals and construct new knowledge in a thoughtful way in rather idiosyncratic and changeable ways (McDevitt & Ormrod, 2010:234).

The information processing approach emphasises the amount of information a learner at a given age can process. The terminology for this approach stems from classical memory research such as short- and long-term memory, storage capacity, speed of processing and attentional mechanisms (McGonigle-Chalmers, 2015:9).

2.3.3.4 The dual-store information processing model

The dual-store model or three component model, proposed by Richard Atkinson and Richard Shiffrin (Ormrod, 2016:205), has contributed to research and so continues to be a popular model for understanding the nature of human memory.

The dual-store model upholds that memory consists of three components, namely the sensory register, the short-term or working memory and long-term memory. The model is referred to as the dual-store model, because it portrays the short-term memory and long-term memory as distinct units (Ormrod, 2016:180).The sensory register is the first step in processing information. All stimulation from the environment is sensed as information in the information processing system. The information is momentarily registered in one of the sensory memories before either discarding it or transforming it into recognisable patterns and passing it on to the next step of short-term memory (STM). There is a separate sensory memory linked to each of the five senses, but all are taken to operate in the same way (Arends, 2012:269; Ormrod, 2016:181). The concept of the short-term memory has largely been replaced with that of the working memory. The model of the working memory is constantly being re-

evaluated and modified as research uncovers more information concerning memory. The working memory is a more active system which processes information as well as storing it. Conscious mental activity takes place in the working memory. The working memory contains a central executive module which controls the operation of a number of slave systems, which deal directly with incoming sensory information. The information is known as selective perception or feature perception. Working memory attends to information in the sensory register that merits attention, holds the information for a longer period of time, and processes it further (Uden, 2006:6; Gould, 2012:145). It may also hold and process information retrieved from long-term memory (LTM). Information retrieved from LTM helps in interpreting information received from the environment. The working memory has a limited capacity, only holding about seven single-digit numbers or four meaningful pieces of information at any single time (Arends, 2012:269; Ormrod, 2016:204). Information is stored in a different form in the working memory through a process of encoding. Information can be encoded as visual or acoustic information, which seems to be the preferred method for the working memory (Gould, 2012:145).

Things to be remembered are transferred from the STM to the LTM for permanent storage through a process called semantic encoding to a form that enters the LTM. Encoding occurs when new and existing information is integrated in the STM and transferred to the LTM where all memories are permanently deposited. It is the most complex of the different components of the memory system and needs a lot of organisation and flexibility. The exact capacity of the LTM is unknown but it is limitless. Encoding in the LTM takes on different forms. Knowledge in LTM is interconnected with related pieces of information being connected with each other. Virtually every piece of information in the LTM is probably directly or indirectly connected with every other piece (Uden & Beaumont 2006:7; Ormrod 2016:194). The two major types of LTM are the declarative and non-declarative memory. Declarative memory is memory relating to knowledge that can be stated or declared in words or symbols and is therefore often referred to as explicit memory. It includes semantic memory and episodic memory, which is memory of events or experiences. Individuals can easily recall and explain explicit memory. Non-declarative memory or implicit memory is memory relating to knowledge that cannot be explicitly stated. Procedural memory is part of non-declarative memory. Much of memory is implicit knowledge, which impinges on the behaviour of individuals even though they cannot retrieve and inspect it (Gould, 2012:147-148).

The information processing model proffers learning as the development of associations. Cognitivists use the term scheme or schemata to describe the way people organise information about certain subjects and how this organisation controls their processing of new information and ideas. Prior knowledge is metaphorically referred to as schemata. LTM comprises schemata which are organised systems of associated knowledge. Schemata gives a structure upon which associated but unknown knowledge may be included. Learning is made easier if new knowledge is compared to existing knowledge and is organised or representational. Schemata are constantly refreshed and restructured when new knowledge is encountered, while other associations among connected schemata are created(Uden & Beaumont, 2006:7). Information from the LTM can be retrieved from the STM. Retrieval needs the activation between a variety of schemata that are cued based upon ongoing cognitive demands. Retrieved items may merge with others to bring about new kinds of learning. Schema theory explains how an individual's thinking uses a variety of systems, such as concept maps or graphic organisers, to develop skills. Schemata are the foundation for all knowledge and provide learners with the means to compare and contrast new information with existing knowledge, assimilate new information, and frequently restructure knowledge accordingly. It is easier for a learner to process new information and to see abstract relationships if prior knowledge and schema for a particular topic is more complete. Availability of schemata improves meta-cognition(Arends, 2012:270-271;Harasim, 2017:50). Important principles of learning that come out of the information processing theory include the importance of prior learning, cognitive engagement, meaning knowledge and learning knowledge (Uden & Beaumont, 2006:8).

2.3.3.5 Classroom application of cognitivist and information processing theory

Cognitive learning theorists emphasise information processing to clarify developmental changes on problem-solving responsibilities as well as on normal memory tasks (McGonigle-Chalmers, 2015:9; Harasim, 2019:51).Cognitivists see people as processing and storing information in the process of learning. They see learning as involving active ways of building schemata and processing information. The way each part of the memory system works, and the way knowledge is symbolised has important implications in learning when using the transmission model (Jordan *et al.,* 2008:38). Meaningful information must be stored in the memory through selection, organisation and integration. Information that has been perceived must be organised in the working memory before it is stored in the LTM. The way information is organised in the working memory determines the meaningfulness of the

learning, which results from the storage of information in the memory in an organised and meaningful manner (Uden & Beaumont,2006:9).

The cognitive approach focuses on using appropriate strategies to make learning happen (Ertmer & Newby, 2013). Learners are guided in organising the content, identifying logical relationships within the content to achieve deeper and meaningful learning. Cognitivists emphasise the learner's cognitive processes and the important function that memory plays in helping learners to interpret new information into a meaningful form that can be remembered and used (Uden & Beaumont, 2006:10).

The cognitive learning theory offers a holistic approach to instruction. Its focus is on the whole picture and how the different parts of the picture relate to each other. The main role of the teacher is to arrange external conditions to help learners to focus on, encode and retrieve information. Meaningful learning is achieved through the assimilation of organised information with existing familiar knowledge. The learner's cognitive processes are believed to impact the learning process. Meaningful knowledge helps learners in organising and relating new information to existing knowledge in memory. Effective learning should be based on learners' existing mental structures(Uden & Beaumont, 2006:10).Retention and problem-solving is improved by using conceptual models that help learners to construct mental structures by focusing attention on pertinent content and providing a way by which it can be used to create solutions to unknown problems (Uden& Beaumont,2006:9).

The cognitivist learning theory promotes teacher-centred methods of instruction because it assumes that the role of the learner is to assimilate the teacher's information. The cognitivist teacher controls the process of instruction where the teacher transmits his or her knowledge to learners. The key task of the teacher is to establish relationships with the learning material for better understanding. The teacher must know learners well enough to ensure that the most suitable strategies are used to accomplish a good understanding of material to be learned. The teacher has to have a clear picture of the structure and relationships of concern in the study material(Gould, 2012:57; Harasim, 2017:60).Learners bring diverse knowledge to the learning situation which they relate to new information in order to establish meaning. The teacher identifies prior knowledge and experience and thinks about the suitable tasks required for learners to effectively and efficiently process new information. The teacher makes sure that learners possess prior knowledge and experience to allow for assimilation of the new

material. The teacher makes use of discovery learning and group learning strategies to manage problem solving(Ertmer & Newby, 2013:52; Harasim, 2017: 60).

The cognitive approach makes use of expressive or process objectives, which objectives are evocative, rather than prescriptive. Expressive objectives are flexible to allow for some individual interpretation; however, it does not reduce learning to mechanistic behaviours. Expressive objectives describe an educational encounter rather than a prescription of what is to be learned and help the teacher to provide contexts where meanings become personal and where learners could respond in an individualised manner. Cognitivists use the process model of curriculum planning which aims to build up understanding by focusing on cognitive processes. It focuses on the process of thinking and how material is processed and organised (Gould, 2012:59). Learners gain a better understanding of the subject matter by familiarising themselves with both subject's structure and its particular ways of thinking storing facts and knowledge. This demands a specific role from the teacher who is differently portrayed as "senior learner" and "problem-setter" rather than "solution giver" (Gould, 2012:60).

The teaching methods of the cognitive learning approach give a considerable amount of control to learners. Cognitive learning approaches focus more on the learning process than the content. The context of learners influences the learning process. The learner is the focus of the teaching and learning process and are actively involved in the learning process. Learners can cognitively process the information in their own particular ways rather than recall information. Cognitivist instruction strategies include the use of discussion, metaphors, deductive and inductive approaches, problem solving, mind maps, advance organisers and analogies. A teacher incorporates cognitivism into the classroom by connecting concepts together, connecting concepts to real world examples, discussions and problem-solving (Stevens-Fullbrook, 2020). The approaches encourage thinking, processing and organising information where knowledge is organised in such a way that learners are able to link new information to existing knowledge in some meaningful way through the use of analogies and metaphors. However, learners process a limited amount of information at a time (Ormrod, 2016:205).

Assessment in a cognitive learning approach is largely concerned with the development of the ability to interpret and structure information. The methods of assessment used in a cognitive learning approaches test for understanding. Learners should be able to identify relationships and present reasoned arguments. Assessment activities include techniques like

comparison, sequencing, categorising, following directions, recognising similarities, problem-solving and essays. Cognitivists prefer the essay method of assessment because it allows the learner to demonstrate understanding and original thinking. Essays provide an open-ended form of assessment where learners are given a certain amount of freedom to develop their own ideas and arguments (Gould, 2012: 60).

The cognitive learning approach aims at allowing a learner to develop a positive academic self-concept, which helps learners approach learning tasks with an expectation of success. Learners put a genuine effort and have a positive attitude to learning thereby making inappropriate behaviours unlikely. Cognitive learning approaches try to turn a negative academic self-concept into a positive academic self-concept by encouraging the establishment of a rapport or relationship with the learners. Learners need to experience some success in their learning in order to turn around a negative academic self-concept. Learners are made to experience success by setting short-term achievable targets accompanied by work which is carefully structured to ensure a successful outcome. The learner's recognition and acceptance of success as his or her own, is very important (Gould, 2012:75).

The strength of cognitivism is also a source of its weakness. Learners with no relevant schemas or prior knowledge are at a big disadvantage. A teacher needs to make sure that teaching and learning activities are relevant for all skill levels and experiences, but designing such instructional activities may be expensive and time consuming. The learner may get to know a certain way of doing things based upon specific cues but that may not always be the best, most efficient, or safest way to do something in the advent of different environmental stresses or scenarios (Jordan *et al.,* 2008:48). Cognitivism also ignores social processes and personification. It treats teaching as a technical rationality activity and disregards the element of reflective practice and creativity that is involved (Jordan *et al.,* 2008:51).

2.4 SUMMARY

The main purpose of the study was to investigate the perceptions of primary school student teachers regarding the practical application of constructivism and to assist this research, the chapter discussed the concept of learning and examined the application of traditional approaches to learning. Traditional approaches to learning were discussed in the context of behaviourist and cognitivist notions of learning and instructional practices that are promoted by the two perspectives, were highlighted and evaluated. Traditional approaches still dominate teaching and learning in the schools. The reviewed literature made apparent the

limitations of traditional approaches in learning and teaching. The practical application of traditional approaches, which contrasts sharply with those of the constructivist approaches, are teacher-centred with knowledge presented to the learners being packaged, complete and subjective. The knowledge is easily transferred to passive learners and portrays a world that is static and unchangeable with the understanding that reality is fixed. Traditional approaches promote methods of instruction that do not encourage the type of learning that young learners need for the future. The role of the teacher and learners in a traditional learning situation are clearly set out. Learners are made to believe that power, authority and activity are held by the teacher. Traditional approaches face some limitations in equipping learners with valuable skills they need to meet the complex demands of the 21st century. The twenty-first century is a digital age. It needs learners who are able to manage information or knowledge, rather than merely receive information from teachers. Traditional teaching approaches do not provide a rich learning environment that enables learners to develop a range of skills. They do not provide contextual context, opportunities for practice, discussion and feedback. In contrast to this approach, constructivist learning theory highlighting its application to learning situations is discussed in the next chapter.

CHAPTER THREE

CONSTRUCTIVIST TEACHING AND LEARNING

As long as there were people asking each other questions, we have had constructivist classrooms. Constructivism, the study of learning, is about how we all make sense of the world, and that really hasn't changed. Brooks 1999.

3.1 INTRODUCTION

Constructivism forms the backbone of this study. This chapter examines constructivism as an epistemology and as a learning theory. The theories of John Dewey, Jean Piaget and Lev Vygotsky are examined. The chapter explains the process of knowledge construction in constructivism and how it impacts learning in the classroom. Linkages are drawn between constructivist theory and the processes of instruction. The chapter examines the various types of constructivism and looks at how they are used in education. Emphasis is placed on those types of constructivism that are relevant to learning.

3.2 CONSTRUCTIVISM

This section offers a brief historical background of constructivism before discussing the constructivist theory and its application in the classroom.

3.2.1 General Description

Constructivism, regarded as both an epistemology and a learning theory, is a more recent theory of education which has a positive influence on enhancing the process of learning. Constructivism has already had a direct influence on many effective learning practices (Jordan *et al.,* 2008:66). The origins of constructivist epistemology are not clear. It is not clear whether its beginning can be dated to seventeenth or eighteenth century or even earlier to Socrates. In Western thought, the roots of constructivism have often been dated to Greek philosophers Heraclitus, Protagoras and Aristotle who are seen as the earliest Western constructivists (Pritchard & Woollard, 2010:2). The idea of constructivist epistemology is clearly found in the Enlightenment era of the eighteenth century in Kant's philosophy, although he does not use the term. Kant is probably the most famous figure of the Enlightenment, seeing freedom as the essential destiny of humanity. He saw servitude to traditional authorities as the barrier preventing individuals from achieving full maturity (Allen & Goddard, 2017:4). Kant was of the opinion that a priori knowledge must come

before any grasp or understanding of human experience. He argued that there must be some inherent organising principles within every person's consciousness by which he or she structures, arranges and understands all data. Kant postulated that people construct and do not discover what is known. Therefore, he posited that knowledge is free of any sort of outside reality. Knowledge is the creation of the mind and the different interpretive practices that go along with it (Cavana, 2009:3; Lynch, 2012:166). A more focused consideration of constructivism puts the actual development of the theory in the twentieth century. Gaston Bachelard (1884-1962) in 1934 said, "Nothing proceeds from itself. Nothing is given. All is constructed". This view suggests that individuals are active, and not passive participants in the construction of the world in which they live. Constructivism in its modern form owes a lot to theorists like John Dewey, Jean Piaget, Lev Vygotsky and Paulo Freire. The constructivist learning theory can be traced back to Dewey (1938:13) who stated that "all genuine education comes about through experience". Jean Piaget is regarded as the founder of constructivism since the psychological foundation of constructivist learning began with his developmental work of genetic epistemology which analogises the development of the mind. Piaget was the first to use the term "constructivism" with reference to how individuals come to acquire knowledge (Waite-Stupiansky, 2017:4).

Constructivism is a branch of cognitivism. In the topic of learning, constructivism comes under the heading of cognitive science. Cognitive science is abroad science which began in the first half of the twentieth century. During this period, scholars from the disciplines of psychology, artificial intelligence, philosophy, linguistics, neuroscience and anthropology realised that they were trying to solve problems related to the mind and the brain. Cognitive scientists study a wide range of things such as how people learn, remember and interact. Their emphasis is on cognitive processes and also on modern technologies (Pritchard, 2013:26). Constructivists react against behaviourist and cognitivist notions that humans can be programmed like robots to always respond in the same way to a stimulus. Constructivism developed from cognitivism and this makes it difficult to draw a distinction between the two perspectives because both are interested in cognitive processes (Jordan *et al.,* 2008:55). Cognitivists focus on how information is processed while constructivists focus on what people do with information to construct knowledge (Pritchard, 2013:27). Constructivists recognise the big role played by the mind in determining how people act. The role is not directly comparable to a software programme based on discrete steps to consume and process information as put forward by the cognitivists. Over time, constructivism has become an

established theory, though its definition and uses are still a work in progress. Many researchers believe that constructivism is a valid theory though there are some critics. Constructivist learning theory is criticised for not being scientific, complex, multifaceted, and somewhat indefinable (Lynch, 2012: 167; Harasim, 2017:62).

Constructivists propose that people construct their own understanding and knowledge of the environment around them through processes of thinking, based upon what they see or experience and reflect on those experiences. In teaching and learning, constructivism epistemology proffers that learners develop their own knowledge. The constructivist learning theory hypothesises that learners actively and continuously construct their own understanding of reality and the environment around them through a process of reflection (Lynch, 2012:167). Constructivism proposes that learning is an active, contextualised process of knowledge construction rather than an acquisition of it. The corollary of this viewpoint is that knowledge originates from within the learner (Pritchard, 2013:27). Learners always encounter new ideas, new things and new perspectives of which they come to have an understanding by reconciling them with their prior experiences through a process of asking questions, exploring, engaging in dialogue with others and reassessing what they already know. The process results in the learner either throwing away the new information as unrelated to their prior knowledge or assimilating the new information with their views. Learners are therefore active creators and constructors of their own knowledge and understanding about the environment around them (Lynch, 2012:167; Harasim, 2017:62).

Constructivists regard knowledge as active and changing and created socially rather than something complete and fixed. Knowledge is assumed to be subjective and not something obtained by passive assimilation or by simple transfer from one learner to another through interaction. Constructivism suggests that the learner is much more actively involved in a cooperative venture with the teacher and with other learners in creating or constructing knowledge. All learners perceive the world differently because of their varied experiences due to diverse backgrounds (Lynch, 2012:166; Harasim, 2017:63). As a result, constructivism argues that knowledge should not be assessed in terms of whether it is true or false but in terms of whether it works or not. What matters is whether the knowledge that is developed, works properly in the situation in which it arises (Lynch, 2012:167).

Constructivists emphasise the type of learning where the learner is helped to make connections and to gain new insights (Carnell & Lodge, 2009:59). The learning process

should be an active, contextualised process of constructing knowledge rather than transmitting it. Learners' construction of meaning and knowledge should be put at the centre of the learning process. Prior knowledge, on which learners build knowledge, is given an important status in constructivist learning. New information is connected to prior knowledge thus making mental representations subjective. Constructivism does not construe knowledge as fixed truths, rather knowledge is found inside the minds of the learners and is not imposed from outside. All knowledge is subjective and personal and a product of individual cognitions (Schunk, 2012:231; Pritchard, 2013:27). Learners involvement is central in the learning process. Constructivists emphasise the importance of the contributions of learners to what is learned. Constructivists claim that learners understand better the information they have constructed themselves, regarding learning to be a social process that involves language, real world situations, interaction and collaboration among learners. Learning is influenced by the learner's prejudices, experiences, the time in which they live, and both physical and mental maturity (Schunk, 2012:231; Bawa & Suleiman, 2015:72).

Constructivism promotes a learner-centred approach to teaching. The teacher's major role in a constructivist classroom is create opportunities for learners to actively engage in their own contexts and to be responsive to individual needs. The teacher should design learner-centred lessons to facilitate learners' learning, organising the learning experiences based on an understanding of the curriculum (Pritchard & Woollard, 2010:47). Constructivist lessons should be less formal and rigid but the teacher should be sensitive to the needs of the learners. Facilitating learning involves active listening and repetition of what the learner says so as to develop sense and thoughtfulness (Lynch, 2012:167). Learning activities organised for learners in the classroom should involve critical thinking, motivation, learner independence, feedback, dialogue, language, explanation, Socratic-style questioning, learning through teaching, contextualisation, experimentation and real-world problem-solving (Pritchard & Woollard, 2010:47). Questions that are posed to learners help to stimulate self-construction of knowledge and promote interaction amongst learners. Learners must be provided with opportunities to feel that they are in control. They must be allowed to construct their own understanding of the content individually and collaboratively. As learners collaborate, discuss, and share their prior experiences with each other, they learn the content of the lesson. The engagement should be cognitive, kinaesthetic and social in nature. Learner reflection, cognitive conflict and peer interaction is highly valued and encouraged in a constructivist learning environment (Pritchard & Woollard, 2010:45). Learners' pre-existing conceptions

and experiences are supported and built upon through designing appropriate learning activities. When constructivist learning experiences help learners to become independent thinkers, they develop life-long learning skills and strategies that help them to transfer knowledge to situations outside the classroom (Nations, 2007:285; Pritchard & Woollard, 2010:48).

Constructivist learning theory is a broad term representing a range of perspectives based on two or more rather distinct positions which share some common denominators but with differing corollaries. In order to understand the practical application of constructivism, it is important to examine the many types of theories that influence its application in the classroom.

3.3 TYPES OF CONSTRUCTIVISM

There are different explanations for the construction of knowledge and understanding within the constructivist theory. The explanations give different views on how knowledge is constructed. The explanations emphasise different possible corollaries (Pritchard, 2013:28). In a way all constructivist perspectives can be regarded as variants of radical constructivism (Steffe & Gale, 2012). The next section presents an overview of four such types of constructivism which are most relevant to teaching and learning. The different types of constructivism to be discussed are radical constructivism, cognitive constructivism, social constructivism and critical constructivism. Cognitive constructivism and social constructivism are the two main perspectives associated with constructivism. Radical constructivism and critical constructivism are also important perspectives that are discussed in the next section. The types of constructivism differ in their attention to the social and individual, but they all agree on the notion that learners actively construct meanings based on their prior individual knowledge and their experiences (Winterhalder, 2017:13).All constructivist perspectives agree that learning is an active process of constructing knowledge rather than acquiring it and that instruction is a process of supporting that construction rather than communicating knowledge (Harasim, 2017:62).The overview, however, begins by examining the views of John Dewey who is regarded as the philosophical founder of constructivism.

3.3.1 John Dewey

John Dewey was an American philosopher and educator. He is regarded as the philosophical founder of constructivism with the origins of constructivist learning theory being traced to his ideas. Dewey was one of the founders of the method of progressive education in North America and inspired most of the practices that are being applied in constructivist pedagogy (Cavana, 2009:3). Progressive education reacted to the traditional behaviourist education that dominated educational practice during Dewey's time resulting in Dewey challenging traditional notions of education and learning. According to Dewey (1938:39): "In a word, we live from birth to death in a world of persons and things which in large measure is what it is because of what has been done and transmitted from previous human activities".

In addition, Dewey(1938:18-19)explained that: "The traditional scheme is, in essence, one of imposition from above and from outside. It imposes adult standards, subject matter, and methods upon those who are only growing slowly toward maturity. The gap is so great that the required subject matter, the methods of learning and of behaving are foreign to the existing capacities of the young. They are beyond the reach of the experience the young learners already possess".

Dewey (1899:151) explained the resistance to the behaviourist forms of education and indicated that "the change that is coming into our education is the shifting of the centre of gravity. It is a change, a revolution, not unlike that introduced by Copernicus when the astronomical centre shifted from the earth to the sun. In this case the child becomes the sun about which the appliances of education revolve; he is the centre about which they are organised".

Dewey argued for the interests of the individual child to be at the heart of active experience, to be an integral part of the design of a flexible and integrated curriculum (Aubrey & Riley, 2016:8). Dewey placed little emphasis on maturational factors in fostering learning but more on learners' understanding of the world through interaction with their environment, thus a focus on individual knowledge construction (Lutz & Huitt, 2004:2; Cavana, 2009:5).

Dewey is considered a pragmatic social constructivist (Cavana, 2009:5). The integration of individual and social dimensions in the construction of knowledge is a central theme throughout Dewey's writings. He regarded learning to be a social activity, something which people do together, in interaction with each other, rather than being an abstract concept.

Dewey contributed the idea that schools should bring real world problems into the school curriculum. He saw learning emerging only from those situations in which learners have to draw out experiences that have meaning and importance from them in their real life. He stated that human thought is practical problem solving, which progressed by testing rival hypotheses. The problem-solving experiences occur in social context, such as a classroom, where learners join together in manipulating material and generate observation outcomes. Dewey's concept of transaction stresses the continuous, intrinsic connection of the organism and the world on the level of action. This practical approach to philosophy has been called "pragmatic social constructivism" and has significant consequences for his educational vision (Lynch, 2012:5).

Dewey placed emphasis on the learner as central to the educational process. Dewey (1991:29-30) stressed the active part of learners: "In the educational transaction, the initiative lies with the learner … If an individual can learn to think only in the sense of learning to employ more economically and effectively powers, he already possesses, even more truly one can teach others to think only in the sense of appealing to and fostering powers already active in them. Effective appeal of this kind is impossible unless the teacher has an insight into existing habits and tendencies, the natural resources with which he has to ally himself".

Dewey's starting point was on the importance of action. Dewey (1979:6) regretted the "the depreciation of action, of doing and making" by philosophers. He saw the elevation of knowledge above practice as being fundamentally connected with the quest for certainty "which shall be absolute and unshakable". The search for certainty is based on the human need for safety and escape from peril. Dewey's notion was to maintain the idea of certainty but based only on pure ideas (Cavana, 2009:5). Dewey (1979:26) stated that many of the long-standing problems of philosophy in general, and of theory of knowledge in particular, could be addressed by "substituting search for certainty by practical means, for quest of absolute certainty by cognitive means". Dewey argued for learner-centred education. One of the fundamental topics developed by Dewey is on the intrinsic relationship between action and knowledge. Dewey (1979:137) said that: "our conceptions and ideas, are designations of operations to be performed or already performed. Consequently, their value is determined by the outcomes of these operations. They are sound if the operations they direct give us the results which are required".

Dewey promoted the value of personal experience in learning explaining that "knowing is not the act of an outside spectator but of a participator inside the natural and social scene, then the true object of knowledge resides in the consequences of directed action" (Dewey, 1979:129). Dewey wanted to reconsider the relationship between the organism and the environment. Dewey argued that education depends upon action to get knowledge about the world. He rejected the notion that schools should focus on repetitive rote learning and viewed the child as an active learner who learns best by doing. He put forward the idea that genuine learning takes place only when learners make independent evaluations based on their interests. Dewey (1899:5) pointed out that when the principle of active participation is neglected, the child "is thrown into a passive, receptive, or absorbing attitude … the result is friction and waste". School time should be "spent in training the child's power of imagery and in seeing that he was continually forming definite, vivid, and growing images of the various subjects which he comes in contact with his experience".

Dewey established the foundations of constructivist learning theory in which prior knowledge becomes the foundation on which new knowledge occurs. Teaching and learning should be designed in such a way as to create experiences that effectively interact with the characteristics of learners so that the learners may construct their own understanding (Cavana, 2009:6).The foundation is thus premised on the line of thinking that instruction must take as its starting point the knowledge, attitudes and interests that learners bring to the learning situation. Dewey argued for the need to train the mind into habits of critical examination and inquiry. According to Dewey (1899:41) "… education must be conceived as a continuing reconstruction of experience; and that the process and the goal of education are one and the same thing". Learners should build up their knowledge and meaning of that knowledge from their experiences.

The implications of Dewey's ideas are that teachers should develop a learner-centred pedagogy in which learners are encouraged to experiment, based on their own interests rather than adopting a didactic model of teaching in which learners only have a passive role. Dewey felt that learner-centred pedagogy enables learners to engage with learning while at the same time preparing them to be active members of their communities and societies as a whole. Dewey's pedagogy encourages teachers to engage learners in problem-oriented projects and help them inquire into important social and intellectual problems. He argued that learning in school should be purposeful rather than abstract and that purposeful learning could be

accomplished by having children in small groups pursuing projects of their own interest and choosing. Dewey viewed education and democracy as intrinsically linked. Dewey described a view of education in which schools would mirror the larger society and classrooms would be laboratories for real-life inquiry and problem solving (MacBlain, 2014:210).

The application of Dewey's ideas in teaching and learning draws attention to the role of the teacher within a learner-centred philosophy and to the importance of reflection for both learners and teachers. Dewey did not devalue the role of the teacher in teaching and learning. He proposed that learners needed direction and that teachers have an important responsibility in facilitating learning, encouraging and channelling learners' curiosity and motivation so that they can develop intellectually (Aubrey & Riley, 2016:6). Dewey argued for teachers to embrace inclusivity and for all learners to contribute and build knowledge for the shared benefit of all, despite abilities in an environment which celebrate differences. This should be achieved by setting differentiated tasks and objectives for all learners and enabled through open-plan classrooms and work-shops which encourage participation and dialogue by all (Aubrey & Riley, 2016:15).

3.3.2 Cognitive Constructivism

The concept of cognitive constructivism will be clarified in the next section before highlighting the proponents and application of cognitive constructivism in the classroom.

3.3.2.1 Concept clarification

Cognitive constructivism and its cognates of individual cognitive constructivism, trivial constructivism, psychological constructivism, or Piagetian constructivism (Jordan *et al.*, 2008:56; Lynch, 2012:169; Killen 2019:14) draws heavily from the work of Piaget on cognitive development (Gray & MacBlain, 2015:5). Piaget described the child as a 'lone scientist". The view given is that of a picture of a child discovering the immediate surroundings and making conclusions about the nature and structure of the world alone (Pritchard, 2013:31).Piaget proposes that individuals construct a personal meaning of reality. Cognitive constructivism is a personal form of constructivism where learning is constructed within the individual, based on prior information (Kasemsap, 2015:3). Cognitive constructivists suggest that individuals actively construct and reconstruct knowledge in order to make it meaningful but differ in their explanations of how information is processed in the brain(Kasemsap, 2015:2). It views knowledge as a proactive construction of knowing by the

learner which is triggered by the learner's pursuit for equilibrium or the cognitive system's need for order and stability. There is no transmission of knowledge from an external source to the learner. New information is adapted and not adopted through a process of accommodation within previously existing mental constructs. Different learners receive different impressions of any new information because this information is being accommodated within the learners' different and previously existing constructs. Useful knowledge is likened to a learner's ability to adapt his or her structures of knowledge to the environment and to adapt the environment to his or her knowledge structures. Knowledge construction can never be thought of as a precise interpretation of reality because each new modification of knowledge needs explanation at a higher level. Learners construct mental models of the way things are and these mental models or 'constructs' form personal understandings (Castello & Botella, 2007:265; Jordan *et al.*, 2008:56).

3.3.2.2 Proponents of cognitive constructivism – Jean Piaget

The concept of constructivism is attributed to Jean Piaget (1896-1980), a Swiss biologist and behavioural scientist. It is with Piaget's work that constructivism was introduced for the first time as a fundamental psychological perspective and philosophical orientation. Piaget revolutionised the way educational psychologists and researchers view children's learning and development. However, Piaget focused exclusively on children, and did not discuss adult learning (Waite-Stupiansky, 2017:4).

Piaget proposed a theory of cognitive development which emphasises the idea of transformation in learning and development. Piaget attributed the development of the mind to evolutionary processes and biological development that highlighted the adaptive function of cognition. He called his theory constructivism to represent his idea about how learning occurs. He posited that, from infancy to adulthood, humans learn by constructing progressively complex logical structures as a result of regular active interactions between the structures within their brains and the environment (Waite-Stupiansky, 2017:4; Pritchard & Woollard, 2010:10).The regular balancing and re-balancing between the mental structures of the learner and the environment results in the construction of knowledge for that learner. The learner can then act on the environment in light of new structures. The learner is thus an agent of change of both the internal and external realities. Learning proceeds in expected vectors and models but is not linear nor lock-step. Piaget proposed that learners learn through the construction of one rational structure after another (Harasim, 2017:63)with children moving

through four stages of cognitive development, starting with the sensory motor stage and progressing to preoperational, concrete operations and formal operations. The stages emphasise how children learn about their worlds and themselves. During the sensory motor stage (from birth to two years), children spend most of their time learning fundamental schemas and object permanence. During the preoperational stage (two to seven years), children build up additional schemas and the capacity to think symbolically. They also have difficulties in seeing the world from the viewpoint of others. During the concrete operations stage (seven to eleven years), children begin to apply logical reasoning but on the concrete plane. They start with here-and-now interactions with the environment and also develop the ability to conserve. In formal operations (11+ years), reasoning becomes more complex and accurate and learners become more logical and abstract thinkers. Learner's intellectual growth is measured against the description of the four stages. Understanding the learner's stage of cognitive development is important for knowing what the teacher should present to the learner, based on what the learner is capable of doing at that stage (Pritchard & Woollard, 2010:13; Waite-Stupiansky, 2017:5; Stevens-Fullbrook, 2020).

For Piaget, the whole process of cognitive development is active, requiring the rediscovery and reconstruction of knowledge across the whole process of stages (Stevens-Fullbrook, 2020). Cognitive development progresses through adaptation and organisation. Adaptation is the ability to use knowledge and children adapt to the environment through processes of assimilation and accommodation. Assimilation involves taking in new knowledge into existing understanding and accommodation involves changing the way the mind is organised so that unfamiliar information, which does not fit with existing knowledge and understanding, is accommodated. Accommodation, which increases the knowledge bank by including new information, is the process of achieving a stable state where there is no conflict between new and existing knowledge. The process of adaptation allows the transition from one stage to the next. Learning is therefore a continuous sequence of assimilation, accommodation, equilibration, assimilation and so on (Pritchard, 2013:28).

Piaget called his theory "constructivism" to represent his idea about how learning occurs. He used the term constructivism to put forward the idea that people build up their knowledge as a result of continuous active interactions between their surroundings and the structures within the brain of an individual. Piaget opposed the notion that learning was the passive assimilation of given information. He proffered that learning is a self-motivated process

which is comprised of successive stages of adaptation to reality during which learners actively build up knowledge by constructing and trying out their own hypotheses (Lynn & Cohen, 2017:4).The regular construction and re-construction between the mental structures of the learner is a result of active interaction with the surroundings which leads to the building up of knowledge for that learner (Lynn & Cohen, 2017:4).

Piaget made the judgement that children and their forms of thinking are primarily completely different to those of adults. He also proffered that successive knowledge-building behaviours increase in strength and intricacy as children move from one stage to the next in the development of his age-based stages (Harasim, 2017:63). Piaget established the fact that children are essentially inquisitive and are always motivated to comprehend the surroundings around them. The children's inquisitive nature prompts them to actively build up representations in their minds about the environment they are experiencing through developing schemas of knowledge or mental models of the world. Experiences enable children to construct schemas, which allow children to recall, understand and create expectations (Pritchard, 2010:11).

Children acquire more language and memory capacity as they grow older. Their mental representations of the world become more elaborate and abstract. Children bring in a dynamic balance between the influx of new information and experience and existing structures through a process called equilibration. Disequilibrium is the lack of balance between what is understood and what is encountered and is an uncomfortable state of being. People naturally want to restore equilibrium through a process of equilibration or the process of restoring balance. Equilibration offers individuals an opportunity to grow and develop. Knowledge therefore constantly evolves and changes as learners come across new experiences that force them to build on and modify prior knowledge (Arends, 2012:400). Piaget's theory has been criticised a great deal over the years and is less contemporary and influential, but it has had a major impact on educational practice. However, Piaget's notion that learning is a transformative process rather than a cumulative one is still central to learning theories. Piaget's ideas still form the basis for describing the process of mental change.

Piaget's work creates the necessity for teachers to have knowledge of the cognitive development of children and how they learn and think. Piaget perceived teaching to be an art. He believed that teaching shapes the minds of the learners and therefore teachers must acquire knowledge of their learners' minds (Saran, 2007:190). Piaget's theory suggests that

each learner is born with an inherent capacity, tendency and aptitude which is drawn out and developed by education. The teacher should plan the content of his or her work to develop all the inherent capacities of the learner to the fullest extent (Lefrancois, 2012:221). Teaching and learning should focus on what to teach to different age groups. Learning is achieved by placing appropriate challenges and tasks in front of learners. The tasks and challenges should be designed to elicit predictions from the child in increasing sophistication in relation to the mental structures the learner brings to bear on the problem (Steffe & Gale,2012). The primary school curriculum recognises the importance of making the transition from preoperational to concrete operations. Most teacher education courses in educational psychology include Piaget's theory of cognitive development. In teacher education programmes, student teachers are made conscious of the significance of the stages of cognitive development each learner has reached, and they try to teach them accordingly. Teachers should be conscious of the fact that learners develop intellectually, physically and emotionally at different rates. This is a significant move away from the traditional approach of 'one size fits all'(Harasim, 2017:63).

Piaget's theory encourages a learner-centred approach in teaching and learning. Individual differences are a major topic in teacher education. Teachers should acknowledge the uniqueness of each learner and that each has its own need and interests. The learner should be the main driver of their own learning and teachers should be flexible in their planning to meet the requirements of the learner rather than teach according to prescribed objectives. Piaget was a firm advocate of the importance of play in a learner-centred approach as play supports a learner's cognitive and emotional development with the development of problem-solving and creative abilities. Piaget (1964) suggested that play helps learners make sense of their environment. Appropriate play activities are provided for in most primary school curricula and it is recommended that each of the stages of cognitive development could be typified by the types of play in which learners engage (Piaget & Inhelder, 1969). The sensorimotor stage should see learners engage in play which is dictated by their developing mobility which is largely restricted to the uses of senses and the information gleaned from their immediate environment. At the preoperational stage, play becomes very important in supporting learners' cognitive development. Learners should be engaged in symbolic play so that they begin to make sense of objects and people around them. In the concrete operational stage, learners should be aware of the rules of play so that they can change the rules to suit a situation.

3.3.2.3 Teaching and learning in cognitive constructivism

The implications of Piaget's theory have shaped the foundation for constructivist education. Cognitive constructivism borrows heavily on Piaget's work, but it fits well with other models of cognition such as information processing or parallel-distributed processing model. Cognitive constructivism sees learning as a personal act, a primarily individualistic enterprise, with personal outcomes, and depending on individual cognitive structures and processes (Lynch, 2012:169). The perspective proffers that learners of any age are actively involved in the process of acquiring information and constructing their own knowledge. Cognitive constructivism emphasises internal cognitive processes in learners' construction of knowledge (Steffe & Gale, 2012). Cognitive constructivism considers learning to be an active and social process where learners actively build up meaning from their experiences, which means that when they come to school, they bring with them a lot of strongly created ideas about issues in the world (Kasemsap, 2015:5).

Cognitive constructivism is centred on how a learner builds knowledge by working alone and cognitively. Learners actively build knowledge for themselves by structuring their own representations of the material to be learned (Killen, 2019:14).This implies that the rationale for education should be to educate the learner in a manner that supports his or her interests and needs (Lynch, 2012:168). The learner selects information he or she perceives to be appropriate and interprets it on the basis of his or her knowledge and needs (Killen 2019:14). The learner develops his or her own meaning of the world through exchanges with the surroundings that prompt assimilation and or accommodation, actively constructing knowledge through cognitive processes of analysis and interpretation. This is perceived as individual work in the school environment. The teacher is responsible for facilitating the alteration or modification of the learner's preconceived ideas and opinions and facilitates this by devising tasks and questions that create dilemmas for learners so that learners create knowledge for themselves as they work through the dilemmas (Arends, 2012:401).

Cognitive constructivism is a decontextualised approach to teaching and learning which assumes that cognitive development takes place in a uniform manner for all learners regardless of the different worlds in which they learn or live. Cognitive constructivism focuses on internal development. The cognitive viewpoint does not focus on the social system and historical context and their impact on formal knowledge in the learning environment (Kasemsap, 2015:6). Cognitive constructivism disregards the influence of classroom culture

and the broader social context. The approach also disregards power issues especially those related to knowledge production (Lynch, 2012:169). Piaget rarely mentioned social aspects in his theory but placed more emphasis on peer interaction because it is critical in the learning process when explaining a problem. Peer interaction is identified as socio-cognitive conflict in the writings on constructivism. Piaget focused on the individual learner but came to realise the importance of social interaction to recognise and resolve cognitive conflicts (Garrison, 2013:3).

Cognitive constructivism forms the basis for individual work learning strategies. The strategies help learners in conceptual rebuilding to discover their ideas, build opportunities for learners, and give incentives for learners. In cognitive constructivism, the learner possesses the objective reality in the mind, but builds up his or her own meaning based on individual apperceptions, which may or may not match up with reality. Cognitive constructivism is characterised by the use of learner tasks that challenge existing concepts and schools of thought such as discovery learning, experimentation, open-ended problems, hands-on activities such as the use of manipulatives, sensitivity to learner readiness, acceptance of individual differences and the notion that learners do not need to have knowledge forced on them but must create it for themselves (Kasemsap, 2015:6).Direct instruction is discouraged in cognitive constructivism because it stifles discovery and constructivist processes of learning (Jarvis, 2010:90).

3.3.3 Social Constructivism

In the next section, the concept of social constructivism is clarified before highlighting the proponents of social constructivism and discussing the classroom application of the perspective.

3.3.3.1 Concept clarification

Social constructivism emerged from the work of Vygotsky and is sometimes referred to as Vygotskian constructivism. The perspective relies heavily on a Vygotskian view of social knowledge and focuses on studying the two-way relationship between the individual and the socio-cultural environment (Lynch, 2012:169). Social constructivism tries to explain how people develop knowledge collectively in all areas of life through language use and the consequences this has for their social life (Closet-Crane, 2015:27). The perspective plays a critical role in understanding the process of learning by highlighting the critical importance of

social interactions in the cognitive development of learners. Social constructivism views learning as a collaborative process where knowledge is developed from the individuals' interactions with their culture and society. This means that the development of the individual is placed within a socio-cultural context (Lynch, 2012:169).

Constructivist thinking is underpinned by three important aspects, namely reality, knowledge and learning (Pritchard &Woollard, 2010:7). Reality, according to the social constructivists, is constructed through shared human social activity. Members of a community create the properties of the world which they share and which they understand in an agreed way. Reality is made up by the network of things and relationships that an individual experience and interacts with in life and is not something which already exists in the form arrived at by one individual. These are the things that people in a society believe in and rely on and which constitutes knowledge. Knowledge is created by humans and it is controlled by social and cultural means. Individuals create meanings and understandings through social interactions and interactions with their environment (Pritchard & Woollard, 2010:6). Knowledge is seen as a social product and learning as a social process between individuals who belong to the same community of knowledgeable peers. The constructed product comes into being after its social invention. The knowledge which people have of the world around them is socially constructed within a particular culture at a certain point in time (Closet-Crane, 2015:27). Social constructivism emphasises how social contexts affect the progress and extent of learning which in turn, is affected by two contexts which are the symbol systems acquired by the learner from his or her particular culture and the social interaction with more knowledgeable members of the community. The perspective emphasises the role of others and all forms of social interaction in the process of constructing knowledge and understanding (Pritchard & Woollard, 2010:8). Learning is a social process. Individual development is a product of social interactions through the internalisation of the cultural meanings shared by the group. Individuals build knowledge in cognisance of their surroundings, and in the process, both the surroundings and the individual are changed. The symbol system includes tools like the use of language, mathematical systems and logic which build up during life. Children acquire, internalise, understand and become effective users of the symbol systems in use in the community through interaction with more knowledgeable others. They develop thinking skills as they interact with those around them, especially adults (Pritchard & Woollard, 2010:6).Discourse is regarded as a tool. The use of language in social interactions assists social partners in developing understanding and meaning. A necessary

condition for the communication of ideas and information is to have a common language (Pritchard & Woollard, 2010:9; Closet-Crane, 2015:28). Social constructivists construe affective and lasting learning as taking place for a learner when he or she is engaged in social activity with others. They do not see learning as simply an individual process nor a passive one. Learning takes place when new or repeated sensory input such as words, pictures, music, and stories is related to pre-existing knowledge and understanding (Pritchard & Woollard, 2010:7). Cognates of social constructivism include socio-cultural constructivism, socio-historical constructivism, socio-re-constructivism, and emancipatory constructivism (Lynch, 2012:170).

3.3.3.2 Proponents of social constructivism – Lev Vygotsky

Lev Vygotsky (1896-1936) was a Russian psychologist whose work was not known to the English-speaking world until the 1980s. Vygotsky's ideas have had a great influence on modern constructivist thinking in education. Vygotsky proposed a theory of social constructivism which stresses that learning and development are integrally tied to dialoguing with others. Vygotsky's theories about language, thought and their mediation by society are relevant to constructivism and the understanding of these theories enables teachers to apply various strategies and tactics in teaching and learning settings (Aubrey & Riley, 2016:49).

Vygotsky's view of learning is full of rich social contexts and cultural nuances. Vygotsky (1978)stressed the critical role of social interaction in the development of cognition. Vygotsky believed that every child is born with a basic set of unlearned cognitive functions such as memory and attention that facilitate high-level learning. He believed that children are curious and actively involved in their own learning, but he places more emphasis on social contributions to the process of development. According to Vygotsky, cognitive and language development are shaped by a child's interaction with others which are critical for the development of a child's knowledge, values and attitudes. Vygotsky believed that learners construct their own meaning but posits that what the learner would learn by himself or herself was limited compared to what the learner would learn with someone else in close proximity, supporting and encouraging the learner. Vygotsky's point of view is that indirect learning filtered by a knowledgeable other person is a powerful thing (Wheeler & Gerver, 2015). Vygotsky proposed that the social background of a child plays a critical role in the child's construction of knowledge within the culture where the child matures. He proposed that a child gradually internalises external activities and social activities which include

communication with more capable peers and important others (Gray & MacBlain, 2015:5; Aubrey & Riley 2016:49).A child's level of thinking is expanded because of social interactions. The interactions which children have with others spur the building up of new ideas and enhance the child's intellectual development (Gray & MacBlain, 2015:5). The intellect of the children develops as they confront new and puzzling experiences, and which forces them to resolve inconsistencies posed by these experiences. The search for understanding forces children to link new knowledge to prior knowledge and construct new meaning (Arends, 2012:401).

Vygotsky believed that cultural artefacts, symbols or 'tools' play a central role in learning. Cognitive development depends on the symbolic systems in which individuals grow up. Cultural tools help people to think, communicate and solve problems. The tools could be part of a culture's language, writing systems, games, folklore tales or counting system. Vygotsky believed that the acquisition of cultural tools occurs in an invariant progression of steps, first at the interpersonal level then at the intrapersonal level (Aubrey & Riley, 2016:48). According to Vygotsky (1978:57), "Every function in the child's cultural development appears twice: first, on the social level and, later on, on the individual level; first between people(interpsychological) and then inside the child (intrapsychological)". Vygotsky proposed that learning precedes development as young children absorb the rules and mores of their culture first to bring about cognitive development (Gray & MacBlain, 2015:5). Vygotsky regarded the development of language, a social activity enhanced through interaction with others, as the most significant of all cultural tools. Speech enables children to reflect, make plans, modify their behaviour and solve problems. Social speech is internalised in childhood but becomes thinking as understanding progresses (Aubrey & Riley, 2016:50).

Vygotsky believed that cognitive development depends on the zone of proximal development (ZPD). According to Vygotsky (1978:86),the ZPD is "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers". Vygotsky's work describes three levels of intellectual functioning which characterise a learner's intellectual development. There is the zone of actual development, the zone of proximal development (ZPD) and the zone of potential development. The ZPD is the distance between what a learner can learn on his or her own and what that learner can learn when supported by a more knowledgeable other. A learner within

the zone of actual development is able to attempt or undertake and perform tasks independently with no assistance from others. A learner in the zone of proximal development is able to undertake and perform tasks but with assistance from more knowledgeable peers or others. In the zone of potential development, a learner cannot perform even with the support or assistance of others (Pritchard & Woollard, 2010:9). The ZPD is important for Vygotsky's social constructivism and all social constructivist learning as it emphasises the importance of others who supply the social dimension of learning. Guidance is essential to move through the ZPD. More Knowledgeable Others (MKOs) are expected to help with the learning (Bates, 2016:44).

Vygotsky's theories about the construction of knowledge have been developed further in situated approaches to learning. Vygotsky indicated that processes of instruction are social activities between learners and teachers in socially constructed conditions and suggested that the learning environment should include guided interactions with a more competent and familiar person who would allow learners to reflect on inconsistencies and to modify their conceptions through dialogue. Learning takes place in social situations where learners hold discussions on what they know already. Learners gather information and speculate what they are soon to discover. Learning takes place in engaging, active naturalistic environments where learners challenge each other to go beyond what is in their current thoughts (Winterhalder, 2017:34).

3.3.3.3 Teaching and learning in social constructivism

An important element in Vygotsky's work is his perception that cognitive development requires social interaction. According to Harmelen (2008:36), "Social constructivism has a central precept that knowledge is created by learners in the context of, and as a result of social interaction". Social constructivism regards learning to be a highly social activity (Pritchard & Woollard, 2010:34) with individual cognitive development being influenced by the society and culture in which the learner lives. Learners are largely dependent on social interaction with the people around them for the stimulation, challenges and shared activity which work to promote thinking, engagement with ideas and activities that help to bring about intellectual growth, including the development of knowledge and understanding. The learning process in social constructivism encompasses learners' interactions, cultural histories, experiences, perceptions and worldviews. The people around the learner impact on how the learner sees the environment, and cultural tools affect the process of learning and

cognitive development (Pritchard & Woollard, 2010:35) and thus play a critical role in the learning. Schools reflect the socio-cultural settings where instruction takes place utilising the cultural tools of writing, reading, mathematics and other modes of discourse. Theory and practice are designed by the dominant cultural assumptions. Formal knowledge, subjects, instruction, and manner of presentation in the schools are influenced by the historical and cultural environments that produced them (Lynch, 2012:169).

Social constructivism proposes that the social world develops out of the individual's interactions with his or her culture and society. The teachers therefore need to change their perspectives. Teachers should shift from teaching to facilitating learning with discourse, action, and negotiation in meaning making being given a central role in learning. The teacher's questioning skills are critical. The teacher should question a learner's answer despite them being right or wrong to ensure the learner gains a good grasp of a concept. The teacher should also make their learners elaborate on the answers they give and should not allow learners to use words or formulas without elaborating further explanation. Reflection on answers should be encouraged (Lynch, 2012:170).Knowledge develops as a result of social interactions and the use of language according to the social constructivist. Knowledge is a communal rather than an individual experience. Learning therefore should be a social activity where learners develop knowledge through interaction with their surroundings instead of relying on the teachers' lecture (Lynch, 2012:15). Social constructivism argues that meaningful learning occurs when learners are clearly taught how to use the psychological tools of their culture and are given the opportunity to use the tools to generate a common, or shared, understanding of some phenomena (Snowman, McCrown & Bihler, 2011:295; Killen, 2012:15).

Vygotsky's theory points out that learners learn effectively in groups. Teachers should understand the need for collaboration and building a relationship between the learners. They should realise that by making learners work together, common goals can be achieved. This means that teachers should mediate and structure the process of collaborative learning and peer interaction ensuring that instruction facilitates interaction. Teachers and more capable peers should assist learners to move forward into their ZPD where new learning takes place if they are provided with the right assistance through scaffolding. Scaffolding is the help that is given by more knowledgeable peers or adults when moving through the ZPD (Aubrey & Riley, 2016:52). When scaffolding, the learner is provided with a great deal of support during

the early stages but then the support is reduced, and the learner is allowed to take an increasing responsibility as soon as he or she is able. Social constructivism suggests that learning by one's self is not as powerful or extensive as learning alongside a more competent person. The person would normally be a teacher, but it could also be a peer, older sibling or parent. School staff, other than teachers, teachers, parents, siblings and peers can help with the learning process. Learners learn more widely and deeply within a social context, and the learning is widened and quickened through discussion with more competent people (Pritchard & Woollard, 2010:15; Wheeler& Gerver, 2015).In the classroom the learner's cognitive development depends on the teachers assisting learners in acquiring the basic cognitive tools (Aubrey & Riley, 2016:54) and the teacher's competence in solving problems through their comprehensive knowledge and their sense of duty.

Social constructivism suggests that teachers should place instruction in meaningful contexts where learners are given the opportunity to engage in authentic activities. Authentic activities are genuine classroom tasks and assignments that are similar to typical real-life activities (Pritchard & Woollard, 2010:15). Vygotsky also emphasised the importance of play in children's development. During play, children imitate the adult world of their culture and in so doing, practice these to ensure future responsibilities and values. Learning through play at school should be seen as vital it helps children to internalise cultural and social skills and gain knowledge that develops through interaction with more knowledgeable others (Aubrey & Riley, 2016:50-51). Teachers can also gain insights into the abilities and skills that individual learners have acquired by observing learners at play (Crain, 2014:247).

3.3.4 Critical Constructivism

Critical constructivism is also an important perspective of constructivism. It is clarified in the following section with its relevancy to classroom practice being explained.

3.3.4.1 Concept clarification

Critical constructivism is a new and useful approach which is gaining momentum in education. It is a broad perspective which is concerned with power relations among oppressed and marginalised people on the basis of a range of factors such as race, nationality, ethnicity, gender, sexual orientation, social class, and work. The perspective draws its inspiration from the principles of critical theory of the Frankfurt school. It is theoretically a grounded form of meaning making which encourages reflection on the creation of the self (Kincheloe,

2008:10). The main concern of critical theory is the creation of a just and equitable society where people have political, economic, and cultural control of their lives. Critical constructivists challenge any form of domination, oppression and subordination. The perspective attaches importance to lifting up people's consciousness of the social and cultural conditions in which they find themselves, especially if the conditions are characterised by domination and oppression. The goal of the critical constructivists is to expose all forms of domination and subjugation so as to educate marginalised and oppressed people, regardless of their gender, class and race, so that they liberate themselves. Critical constructivism is also related to a number of movements such as critical pedagogy, critical race theory, and feminist theory in the social sciences (Aliakbari & Faraji, 2011:77; Cooper & White, 2012:18).

Critical constructivism relates the context of the schools to the context of the societies in which they are embedded. Critical constructivism concerns itself with criticising education in capitalist societies and tries to make use of education to respond to inequalities and oppressive power relations which exist in educational institutions. It works at transforming oppressed people and to save them from being objects of education to subjects of their own autonomy and emancipation. It aims at humanising and empowering learners (Aliakbari & Faraji, 2011:77). Critical constructivism wants learners to act in a way that enables them to transform their societies through emancipatory education. In critical constructivism, the learner develops the ability to step back from the world to which he or she has been accustomed. He or she perceives the world and sees the ways his or her perceptions are constructed through linguistic codes, cultural signs, race, class, gender and sexual ideologies, and other often hidden modes of power (Kincheloe, 2008:11). Critical constructivists ask penetrating questions about the way things which are there, have come to be and whose interests certain institutional provisions serve. Critical constructivists reconstruct and rename their world, guided by their critical theoretical system of sense making, which is their emancipatory source of power (Kincheloe, 2008:11).

3.3.4.2 Proponents of critical constructivism

Critical constructivism is associated with the writings of Michel Foucault (1926-1984), Paulo Freire (1921-1997) and Jurgen Habermas (1929-). Foucault's analysis of power relations enlightens the work of Paulo Freire and Jurgen Habermas. The next section examines the work of Michel Foucault and Paulo Freire.

3.3.4.2.1 Michel Foucault

Michel Foucault was a French philosopher who saw knowledge as inextricably linked with power. Foucault's philosophy spans a number of branches of learning which include sociology, history, literary theory and education. He was primarily a social historian. Foucault's main ideas revolved around the reciprocally empowering connection between knowledge and power, and the employment of these two in influencing social control (Aubrey & Riley, 2017:92).

The use of language and communication as part of his notion of discourse is central to Foucault's philosophy. Foucault saw fields of knowledge or disciplines as types of discussions which are made up of theories, attitudes and habits. People internalise these discussions and in general do not have to be pressurised into thinking and behaving in socially suitable ways. Foucault saw social knowledge as politically charged (Jordan *et al.*, 2008:61) and this concept has important consequences on how people converse and how they understand ideas which were previously considered to be firmly established as knowledge. This implies that teachers should challenge the understanding that child development and learning are static in nature and never change. Teachers should also query the approach to comprehending how children learn and how they are taught (Peters, 2001:174).

Foucault's work provides an insight for viewing the field of education, in relation to policy and its implementation. There are also some ideas which challenge the dominant discourse relating to what is perceived as good teaching. Foucault encourages reflective practice. His notion of reflective practice is that of self-monitoring and is offered as an academic challenge with the aim of providing a critically analytic viewpoint. The role of reflective practice is to bring about personal development and active emancipation (Peters, 2001:174; Aubrey & Riley, 2017:102).

Foucault challenged the conventional ways in which people think, live and relate to each other. Foucault offered educators a radical concept of how learners develop and learn, indicating that the manner in which people communicate is governed by a set of regimes which are not primarily formed within the people's consciousness. The way in which people communicate develops from the historical perspectives in which people mature. People are not static in their thinking but change as time passes. These perspectives are reflected in the language used to make sense of the world (Aubrey & Riley, 2017:92).

3.3.4.2.2 Paulo Freire

Paulo Freire was the most cited advocate of critical constructivism. Freire's educational thoughts were influenced by liberation doctrine, Marxism and anti-colonialism. His philosophy is one of emancipation and hope(Jordan *et al.,* 2008:61). Freire's major goal was to change the structure of an oppressive society and his aim was to transform oppressed people by saving them from being objects of education to being subjects of their own autonomy and emancipation. Freire stressed the requirement of a new type of education for oppressed peoples which would not merely be an imposition of the colonialist's civilisation but would allow people to see how their individual conditions were in fact a creation of that culture.

Freire (1996) distinguished between banking education and problem-solving education. Freire metaphorically refers to traditional approaches in education as the banking model of education because it is like depositing money in a bank. The banking model of education reflects the organisation of an oppressive society in which the oppressed and oppressors are divided. Freire was opposed to the banking model because it presents the learners' knowledge which is too packaged, complete and objective. The knowledge is easily transferable into passive learners and depicts a world that is static and unchangeable. It promotes fixation of reality. It is a medium for continuing the political oppression and works against liberation or emancipation. Learners are made to believe that power, authority and activity are held by the teacher. The banking model views learners as objects rather than humans. It is dehumanising because it creates oppressive passivity in learners. Teachers should be concerned about the society and to give human beings the opportunity to critically reflect and act on their position within the society (Aliakbari & Faraji, 2011:77). The model portrays learners as passive recipients of information. Freire disliked the model because it reinforces dominant ideologies and social structures. Freire objected to the dividing of teacher and learner functions, which he felt strengthens conformist power relations. He argued that the relationship between teacher and learner should be democratic and reciprocal and that the prescriptive and compliant nature of laid down curricula suppresses the natural curiosity, critical thinking skills, and creativity of learners. These are abandoned in preference for an inflexible adherence to a socially established view of learning (Aubrey & Riley, 2016:132).

Freire (1996) proposed a problem-solving education, steeped in his notions of dialogue, praxis and conscientisation. Problem-posing education, linked to the requirements and lives

of the learners, is one in which the teachers create problems for the learners concerning features of their lives (Aubrey & Riley, 2016:132). Problem-solving education is based on creativity which promotes true reflection and action to change the world. A problem-posing teacher forms and reforms his or her reflections through an ongoing dialogue with the learner. Problem-posing education is an ongoing and emergent activity where learners and teachers are in the process of becoming. Problem-solving education offers hope for improving conditions for the oppressed in all social, cultural and racial backgrounds, affirming that education can be liberating (Aubrey & Riley, 2016:133).

Problem posing education leads to a form of 'praxis', in which people's knowledge of their situation simultaneously develops with their action within it and upon it as they seek to change it (Jordan *et al.*, 2008:61). It is based on the realities of learners and their life situations. The learners develop power to critically reflect on the way they exist in this world and "they come to see the world not as static reality, but as a reality in process, in transformation" (Freire, 1996:71). Good teaching or problem posing pedagogy leads to the development of knowledge by the learners themselves. During the process, the teacher listens to the learners, then he or she selects and brings known situations to learners in codified forms, and finally he asks a series of inclusive questions regarding the discussion of a situation. To Freire, problem posing education meant that the learners and the teachers are subjects in the learning process. The teacher uncovers reality and creates knowledge of the world. Freire suggested that through the problem-posing process, literacy becomes immediately relevant and engaging by focusing on problematic issues in learners' lives. Freire (1996) argued that problem solving education involves the uncovering of reality, striving for the emergence of consciousness and critical intervention in reality. This consciousness allows learners to take the necessary actions to improve their life conditions and indicates that learners have the right to ask questions (Aubrey & Riley, 2016:132).

Freire was against the marginalisation of groups of learners, pointing out that marginalised learners should be able to reflect on their concrete situations to find out why things are what they are. Learners should be aware of the factors that contribute to their position in society. Teachers should help marginalised learners to recognise the need to change their conditions that prevent them from socio-economic success. He wanted them to be given back their lost voices and identities. When learners develop their voices and resist unjust reproduction, they become active agents for social change (Aliakbari & Faraji, 2011:81).

Freire viewed education as a political practice whose language and consciousness is under the control of rulers who use it to subject individuals. He did not accept claims by the ruling groups that schools distribute knowledge in an objective and neutral manner. According to Freire (1998:30), "teaching that does not emerge from the experience of learning cannot be learned by anyone". Teachers should create classrooms environments where learners are encouraged to act as active agents in their own education and to develop a critical consciousness that helps them to evaluate the validity, fairness and authority within their educational and living situations. Freire (1996:67) also explained that "no one teaches another, nor is anyone self-taught, men teach each other, mediated by the teacher". Freire proposed a fluid relationship between teachers and learners, a relationship where teachers are learners and learners are teachers. This means that learners are not recipients of information but creators.

3.3.4.3 Teaching and learning in critical constructivism

Education in critical constructivism is a liberating process. The aim of education is really on the process of learning but the learning that comes from the critical examination of the social order which leads to action in service of social justice as the result of school learning. A major theme that comes out in critical constructivism is the belief that education systems are political. Critical constructivists are concerned with the centrality of politics and power in understanding how schools work. Learning should aim at political transformation for the purpose of justice. Critical constructivism is concerned with social justice and develops practices capable of transforming oppressive institutions or social relations largely through educational practices.

Critical constructivists propose that learning should raise learners' consciousness. Learning should be used to emancipate and enable learners to act in ways that enable them to transform their societies. Learners should be helped to develop a more accurate perception of their experiences so as to prepare them to engage in a larger struggle. Learning activities must empower learners to challenge oppressive social conditions so that they work toward a more just society (Aliakbari & Faraji, 2011:79). Learning should make learners critically thinking citizens who can take part in the conduct of democratic life. Critical constructivists make such learning take place in an environment connected to everyday life by encouraging discussions conducted within the language and knowledge of the learners.

Critical constructivism understands curriculum as a political context at the centre of which lies the social and political critics of everyday life. The curriculum for the critical constructivist is based on the notion that there is not one methodology that can work for all populations because all decisions related to curricular and material to be studied are based on the needs and interests of learners. The critical constructivist curriculum is framed on the use of learner experiences and realities of their lives. The curriculum is transformative. It fosters learners' acquisition of the necessary strategies and skills that help learners to become social critics who are to make decisions which affect their social, political, and economic realities. Critical constructivist lesson plans are based on authentic materials which represent the cultures that are to be examined by the learners such as TV, commercials, and video movies (Aliakbari &Faraji, 2011:79).The content is immediate and meaningful to learners in order to make them aware of both the reproductive nature and the possibility of resistance to problematic content. The materials serve as a basis for discussion and critical reflection of the culture. Authentic materials help learners to link their knowledge to existing problems in society and take necessary actions for its improvement. Tests and themes are provided both by teachers and learners who bring their experiences for study and place that knowledge within the context in which it was taken. In their assignments, learners are able to pick those themes that are most relevant to their own lives and the context in which they work. These transformative practices help learners to develop skills in reflection and action that allows them to recognise and work against oppressive conditions in society. Special attention is paid to learners' cultural heritage, practices, knowledge and languages in order to enable transformative practice. The aim of transformative practice is social transformation.

In social constructivism, teachers are viewed as problem posers. Dewey (1963)believed that learning through problem solving and practical experience leads learners to take a more active role in determining their experiences and positions within society. The teacher must empower learners by raising their awareness of reproducing processes of an inequitable status quo in schools and offer societal institutions. Teachers are transformative intellectuals who have the knowledge and skill to critique and transform existing inequalities in societies. The role of this transformative intellectualism is to learn from learners, appreciate their viewpoints and take part in the dialogical process. Teachers create appropriate conditions to enable learners to become cultural producers who can rewrite their experiences and perceptions. They also help learners learn from each other and theorise and understand how to question the authoritarian power of the classroom. A critical constructivist teacher elicits

learner opinion about programme structure and curriculum, so as to set up a classroom that is involved in dialogic interaction and to find a way when class discussions are being hampered or stifled (Aliakbari & Faraji, 2011:90).

Critical constructivist teachers also have a critically reflective role for producing an open and equal environment. They engage in deep self-reflection about their position and the effects of their authority in the classroom. The teachers question their own motives, purpose, ideology, and pedagogy as informed by theory and habit (Aliakbari & Faraji, 2011:80). Self-reflection enables teachers to make their classes learner-centred by incorporating unsuccessful educational ideas and oppressive forms in their own educational practices. A critical teacher helps learners to understand the reasons behind the facts. A critical constructivist teacher has to be an authority on his or her subject matter but at the same time should be open to relating what he or she knows through interaction with learners. Critical constructivist teachers communicate with learners about the society and culture to help them reflect critically on various aspects of the culture they are studying and preparing to enter. This way, learners through reflection can determine the necessary types of action that they should take in order to improve the life conditions of the oppressed group. Learners and teachers engage in questioning knowledge, but it is the teacher who helps the learners to identify how to move forward in their practice. Teachers should challenge the current structure by rejecting long-standing cultural expectations and mores of their own and the system. Additionally, they must give up much of the power which is given to them through their positions.

Critical constructivists are concerned about the emancipatory knowledge that helps learners understand how relations of power and privilege distort and manipulate social relationships and help oppressed learners by identifying with them. Learners are active participants in that together with the teachers, they correct the curricula and share their ideas as well as learn to challenge assumptions. Learners contribute to curricular decisions and determine areas of study and the associated reading materials. Learners in a constructivist learning situation accept, reject or suspend judgement about a claim. They can also offer good reasons for their ideas and can correct their own and other's procedures. Learners should engage in social criticism in order to create a public sphere in which citizens can exercise power over their own lives and learning. By enabling learners to reflect on their common-sense knowledge, the learners learn how to transform their lives. This is a shift from naïve consciousness to critical consciousness (Aliakbari & Faraji, 2011:81). Teachers help learners to engage in

critical consciousness by empowering the learners to self-assess. Both teachers and learners are co-agents. The teacher through his authority directs the class but his authority differs from that in the traditional pedagogy. Teachers are in a hierarchical position above the learners with regards to their existing knowledge and institutional authority. Both teachers and learners act as awareness-raising critiques who aim at identifying positive and negative aspects of education. By turning verbal and nonverbal means of education into effective instruments of self-affirmation, learners and teachers understand their roles as subjects of research and agents of agents (Aliakbari & Faraji, 2011:81).

Critical constructivism aims at developing a critical consciousness in teachers and learners. The perspective is concerned about the development of autonomous thinking and a universal social welfare for both teachers and learners. Teachers are regarded as agents of social change who bring about learner empowerment through knowledge acquisition. The perspective is mostly concerned with learners' independent critical thinking. It is concerned with extending learners' consciousness of themselves as social beings in view of the way dominant power works to control knowledge (Watts & Jolifi, 2007:177). Critical constructivism strongly stresses the significance of learners being self-reflective so that they are in a position to challenge dominant social views and articulate opposing views (Jordan *et al.,* 2008:60-61).

Critical constructivism seeks to foster critical thinking and criticality in learners to make them effective lifelong learners. Criticality is taken to be a defining requirement for academic life (Allen & Goddard, 2017:2). Critical thinking is seen as having an emancipatory potential. Critical thinking is reflective, logical, and evidence based. It involves evaluating the accuracy, credibility, and worth of information and lines of reasoning (Ormrod, 2016:432). Critical thinkers are open-minded. They enjoy intellectual challenges and can emotionally handle the idea that they might occasionally be wrong about a topic. The concept of empowerment encompasses the importance of making education meaningful so as to make it critical and consequently emancipatory(Ormrod, 2016:435). Critical constructivism is concerned about ensuring that learners arable to build their own meaning when learning. Such concerns must always be coherently present in teachers' analysis of classroom contexts and decision making (Watts& Jolifi, 2007:178).

Critical constructivism recognises the influence that the lack of education has on oppression of marginalised learners. Critical constructivist teachers are empowered to ask typically

neglected questions about the socio-political purposes of schooling. The teachers clearly discern how education operates to reproduce or challenge dominant socio-political and economic structures. Such theoretical understandings are profoundly important in learning to think, teach and live democratically (Kincheloe, 2008:11). Critical constructivist views imply that teachers must enable learners to express their understanding. This entails learners being active learners who question and transform. This also means that learning is a means to re-create the way learners see themselves, education and society. Learners must also appreciate their own and their peers' understanding and undertake negotiations of knowledge towards an emancipatory construction of consciousness. Critical constructivism also implies that teachers must present problems according to learners' experience. In problem posing, academic material is integrated into the learner's life (Watts & Jolifi, 2007:177-178;Jordan *et al.*, 2008:61).

In a critical constructivist classroom, the teacher leads the class in democratic learning processes as well as with critical ideas. To be critical constructivists, teachers must possess critical awareness, an understanding of themselves, their perspectives, their approaches to the construction of knowledge, and ways in which their own consciousness has been shaped by society. Teachers should be aware of the complexities of learning and learning situations, and have an understanding of the dynamics of power in social settings, and its use towards democratic social and educational change (Watts & Jolifi, 2007:178). The teacher affirms himself or herself without disaffirming the learners. The teacher does not force meanings upon the learners. The learners should respond by reflecting on the lives they lead and asking questions to discover meanings and values. Their learning experiences include a reflective dimension around themes from daily life. The aim is to change learners to being active participants in shaping the economic, social and cultural environment in which they live(Watts & Jolifi, 2007:178).

3.3.5 Radical Constructivism

The next section offers an overview of the concept of radical constructivism, clarifying the concept and explaining its classroom application.

3.3.5.1 Concept clarification

Radical constructivism is considered a significant referent in constructivism (Cavana, 2009:3). Radical constructivism originates with the works of Piaget but it has been fully

worked out in its modern form by von Glasersfeld (Steffe & Gale, 2012). Von Glasersfeld is an influential author within the constructivist context and his work is a mandatory point of reference for every constructivist approach. Ernst von Glasersfeld(1917-2010) pioneered the philosophical epistemological approach. Von Glasersfeld was himself significantly influenced by Piaget (Cavana, 2009:3). Von Glasersfeld coined the notion of Radical Constructivism (RC) to emphasise the sense that from an epistemological point of view, any constructivism is like "going to the roots" or "uncompromising" (von Glasersfeld, 2005a:10).

Radical constructivism's basic tenet is that any kind of knowledge is constructed rather than perceived through the senses. According to von Glasersfeld (2005a:11), "as our thinking, our conceptualising, and language are developed from and in the domain of our experience, we have no way of incorporating anything that lies beyond this domain". The account of the cognising subject emphasises his or her individual cognitive representations of his or her experiences. An individual's representations of the world are personal and idiosyncratic (Steffe & Gale, 2012). Radical constructivism sees knowledge as constructions of the observer, and not an independently existing entity. Radical constructivism discards the likelihood of objective knowledge, given that all knowledge depends on the knower. The existence of an ontological reality does not remove the fact that people can only know reality by assessing how well their knowledge fits with it (Castello & Botella, 2007:264).

Von Glasersfeld (1989:162) put forward two ideas which have become the basis of radical constructivism. The first idea is that knowledge is not passively received but actively constructed by the knowing subject. The second idea is that the function of knowing is adaptive and serves the organisation of the experiential world, not the discovery of ontological reality. The first idea comes from the notion that each individual builds reality for himself or herself. Radical constructivism regards all experience to be subjective and is filtered by a net, or a set of nets, of individual perception, bias and other sensory experience. The mind adapts everything it receives into what is then considered to be reality (Pritchard & Woollard, 2010:8; Steffe & Gale, 2012). The two ideas from radical constructivism, that there is no objective knowledge and that knowledge is constructions of the knower, are a point of reference with respect to other constructivist positions. They are used to define and distinguish several types of constructivism by depending on the acceptance of the first idea only or both of them (Cavana, 2009:4; Steffe & Gale, 2012).

3.3.5.2 Proponents of radical constructivism – Ernst von Glasersfeld

Radical constructivism is discussed by authors such as Maturana and Varela, von Foerster and von Glasersfeld. The authors deny the possibility of objective knowledge. Maturana and Foerster regard living beings to be self-creating or self-producing systems because they are capable of maintaining their own organisation. Foerster supports the notion of self-creating or self-producing systems by arguing that the central nervous system operates as a closed system organised to produce a stable reality (Castello & Botella, 2007:264).

The most prominent radical constructivist is von Glasersfeld, who was significantly influenced by Piaget. Von Glasersfeld opened up the philosophical epistemological approach (Cavana, 2009:3). Von Glasersfeld's radical constructivism, is based on the idea that knowledge is not passively received but actively built up by the knowing subject and the function of cognition which is adaptive and provides for the organisation of the experiential world, not the discovery of ontological reality. Von Glasersfeld calls his position 'radical' because he maintains that constructivism has to be applied to all levels of description "The revolutionary aspect of constructivism lies in the assertion that knowledge cannot and need not be 'true' in the sense that it matches ontological reality, it only has to be 'viable' in the sense that it fits within the experiential constraints that limit the cognising organism's possibilities of acting and thinking" (von Glasersfeld, 1989:162). Von Glasersfeld maintains that knowledge is a development and result of the human brain, and that the degree to which knowledge mirrors external reality cannot therefore be ascertained (Pritchard & Woollard, 2010:9).

3.3.5.3 Teaching and learning in radical constructivism

Radical constructivism, seen as largely individualistic, is regarded as a contrasting version of social constructivism (Pritchard & Woollard, 2010:9). Radical constructivism, referred to as solipsistic, is sensitive to individual knowledge construction. Radical constructivists think that learners build up an individual view of the world alone on the basis of his or her mental processes in dialogue with his or her experiential world (Steffe & Gale, 2012). The cognising learner creates mental schemas to guide actions and stand for his or her experiences. These are tested according to how well they resemble the world of experience and are maintained as guides to action. Cognition relies on an underlying feedback ring where schemas develop and through adjustment, come to better resemble the learner's experienced world. The schemas also divide and subdivide, and possibly some die out. On the other hand, the learner as a

whole adjusts to the environment largely through the adjustment of schemas (Steffe & Gale, 2012).

Radical constructivism holds different implications for teaching and learning as it argues that reality does not exist outside people's constructed understanding and beliefs (Ormrod, 2016:384). Radical constructivists propose that a person cannot uphold that what other people have built up in their minds, is exactly the same as what he or she has built (D'Angelo, 2009:3).Some psychologists and educators argue that learners can never completely know what is real or true about the world because knowledge and reasoning processes are personally constructed and so are inherently human-made entities (Ormrod, 2016:275).

3.3.6 Constructivist Learning

Constructivism offers a considerable departure from traditional approaches. Constructivism attaches meaning to the process of learning and to the gaining of new knowledge (Lynch, 2012:170). Constructivism requires a different set of behaviours from those of the traditional approaches for teachers and learners. Constructivism describes knowledge as the interpretation of the individual's experiences which is further made possible through discourse. Constructivist learning theorists assume that all knowledge is not transmitted but built by the learners as they try to make sense of their experiences. Knowledge and meanings are embedded in activities and results from activity and is found in persons, tools, and other cultural artefacts. Meaning comes from interpretations and thus different points of view are recognised. The process of building meaning is driven by problems, questions, issues, and authentic tasks (Uden & Beaumont, 2006:10).

Constructivism calls for a variety of approaches to classroom management and assessment. In a constructivist classroom, the world can be structured in many ways and different meanings and perspectives for any event or concept are accepted. Meaning in the constructivist perspective is guided by experience. Constructivism concerns itself with how the learner constructs knowledge using prior experience, mental structures and beliefs that the learner interprets. Constructivism does not rule out the subsistence of an external reality. It only maintains that each learner builds up his or her own reality. The constructivist learning process requires learners' active participation in creative activities and self-organisation (Uden & Beaumont, 2006:12). Learners should actively construct knowledge using prior experiences and should not be treated as empty vessels waiting to be filled. Processes must operate so that learners form, elaborate, and the learner's cognitive structures are tested until

a satisfactory one emerges. Meaning is created by the learner. It does not exist out there in the world independent of the learner (Uden & Beaumont, 2006:10).

The goals of constructivist learning are learning in context. The knowledge that learners organise is built up and attained in the context of meaningful learning. Constructivism regards learning as a constant and enduring process which results from action in context. Cognitive processes are fundamental to constructivism. The goals of constructivist learning are to bring about problem solving abilities, reasoning, critical thinking, and active use of knowledge. The goals are achieved by using a variety of approaches recommended by research based on constructivist principles. The approaches focus on the process of learning and not the products of learning (Uden & Beaumont, 2006:10). Constructivist learning theory is concerned more about using the content to develop unique and individual ways of understanding than with coverage of content. Learners must gather knowledge together founded on experiences and grow that knowledge through personal reflection and interaction with others. Learners should interpret, organise and make inferences about knowledge using the cognitive structures that they have previously built. The process should lead to the advancement of meaning from the material through the interaction of learners within the learning milieu (Gray & MacBlain, 2015:4; Stabile & Ershler, 2015:170).

The posing of good problems and collaboration stand out as the most important characteristics associated with constructivist learning. Good problems stimulate explanation and reflection which are necessary for knowledge construction. A good problem is practically multifaceted, which activate the different experiences of learners and therefore encourage diverse approaches to finding a solution. A good problem requires learners to make and test a prediction. Knowledge construction takes place when it is being used to clarify what would have happened and to envisage what will come about. Good problems should be appropriate and motivating to learners. Learners are likely to put in more effort in problems they observe as appropriate. A good problem should allow for collaborative work. Such a problem generates discussion and negotiation that promotes the clarification of different realisations (Uden & Beaumont, 2006:11).

Constructivist learning attaches great importance to the use cooperative learning strategies and the use of metacognitive study strategies by the learners. Learners are presented with problems based on contextual assignments where they should come up with their own unique answers. Learners decide their own behavioural standards when they participate in drawing

up classroom rules and when resolving discipline problems. The learners make use of class meetings, open and reflective dialogue, and problem solving to achieve their goals. Cooperation, essential because of the interactions with others, can be in the form of learner-to-learner and teacher-with-learners. In learner-to-learner cooperation, learners work as peers and apply their collective knowledge in resolving a problem. The discussions coming from the collective efforts, give learners opportunities to test and refine their meanings in a continuing process. Cooperation with the teacher takes the form of an apprenticeship. The relationship between learner and teacher resembles that of an apprentice to his or her master who work together to solve problems. The teacher provides the way, experiences and knowledge to the learners (Brown, 2007:491; Stabile & Ershler, 2015:6).The teacher maintains his or her right to establish precise instructional goals and challenges and facilitate learning while learners to set their own personal goals for learning. The teacher also takes part in solving meaningful and realistic problems. The teacher serves as a model and guide who shows the learners how to reflect upon their evolving knowledge and possible direction to take when facing difficulties (Uden & Beaumont, 2006:12). The teacher poses realistically complex and personally meaningful problems to learners and encourages group activities so that he or she and the learners can participate in a community of inquiry in exploring and applying their collective knowledge. The teacher also nurtures reflectivity. Learning is given impetus through the process of reflective abstraction. Constructivist learning makes use of assessment tools which focus on an individual's growth such as seen in portfolio assessment, rather than measurement. The perspective stresses self-evaluation and peer evaluation (Brown, 2007:491; Stabile & Ershler, 2015:6).

Constructivists also make use of disequilibrium to facilitates learning. Disequilibrium facilitates learning by creating contradictions between the learner's existing understanding and new experiences. This leads the learner to query his or her own beliefs and then attempt to develop new ideas. Constructivist teachers do not reject or discourage errors that arise from learners' conceptions. Learners are also challenged by their teachers to perform open-ended investigations into realistic and meaningful contexts so as to enable them to discover so that they are able to reaffirm or contradict possibilities. Contradictions are examined, illuminated and discussed. Teachers should regard the classroom as a community of dialogue where new ideas are stimulated and exchanged. Learners in the classroom must be given latitude to defend, prove, justify and communicate their ideas but these can only be accepted

as truths if they make sense to the community. If they make sense, they are converted into group knowledge (Lynch, 2012:170).

Constructivist strategies in teaching and learning can be grouped into three broad strategies namely cooperative learning strategies, problem-based learning strategies and classroom discussions. The strategies are essential because they optimise learners' engagement in constructivist learning. The models are learner centred, encouraging interaction between the learners and the teacher and among the learners. Each model promotes investigation and discovery of ideas by the learners and encourages an environment for learning which is free of threats, characterised by independence and scaffolding. The three models, however, differ in some important respects. Some models are strong in teaching social skills, others are more suited for certain kinds of learning, and still others emphasis interactive learning whether in small groups or cooperative learning groups. There is a large information base to shore up the use of learner-centred constructivist approaches which can be used to steer student teachers in their pursuit to understand and use the constructivist models of teaching.

3.3.6.1 Cooperative learning

Cooperative learning is characterised by cooperative tasks, goals and incentive arrangements. Learners in a cooperative learning situation is characterised by learners working in groups to master learning goals. The teams are ideally made up of high-, average-, and low-achieving learners and should include a racial, cultural, and gender mix. Motivational stimuli should be directed to the cluster as well as to the individual. Cooperative learning helps learners to gain academic material and capabilities as well as attending to significant social and human relations, goals and objectives. Participants in cooperative learning depend on each other for an incentive they will share following their success as a group. Coordination of efforts is necessary for completion of the task (Galton, 2007).

Interest in cooperative learning grows out of an endeavour to organise classrooms and instruction practices to lessen intergroup intolerance and to encourage acceptance of diversity. Cooperative learning includes a range of social objectives. Cooperative learning assists in bringing about academic achievement, tolerance and acceptance of social diversity and social abilities development. Learners learn more effectively from their experiences and active participation in small groups. Learners to learn important social skills while at the same time developing academic skills and democratic attitudes. These important educational objectives are accomplished by structuring learners' learning activities so that they model the

desired outcomes. Cooperative learning offers the foundation on which strong democratic communities can be built and maintained (Galton, 2007; Arends, 2012:363).

In Zimbabwean primary schools, learners are seated in groups around small tables. The idea came to the fore in the 1960s and 1970s with the launch of the New Approach. Teaching learners at primary school level to work in small groups includes most of the principles entrenched in the idea of cooperative learning. Empirical evidence supports the idea that working in small groups improves learners' academic performance and attitudes when contrasted to working individually. Groupwork helps to bring about social cohesion, motivation and improvements in self-esteem. Social interdependence through cooperative learning also generates greater intrinsic and achievement motivation. In groupwork, learners are also provided with opportunities to get to know the personalities of some team members who may not be as forthcoming during whole-class discussions. Groupwork promotes both positive interdependence and individual accountability. More knowledgeable members of the group may find it necessary to help the weaker members of the group if the final outcome depends on contributions from all its individual group members. Cooperative learning generates added cooperative behaviour, less competitive behaviour and more interracial or cross ethnic cooperation (Galton, 2007; Arends, 2012:364).

Vygotsky's social constructivism ideas are key to the success of the group. A more knowledgeable other who leads the conversation in a group moves the group further than simple expressive talk to that of clarification and real debate in the same way that a more knowledgeable grown-up can assist a learner to move through the zone of proximal development. Cooperative learning helps learners with their academic learning and performance on important learner tasks. Learning in heterogeneous groups benefits all learners. Less able learners learn more when they work alongside those who are more able and at the same time, more able learners benefit from the process of serving as tutors to their less able peers. Cooperative learning reward structures increases the importance attached to academic learning by the learners and changes the standards connected to attainment (Arends, 2012:364).

Cooperative learning promotes cooperation and collaboration which are critical skills in the world of work. Cooperative learning encourages and attaches importance to the development of interpersonal intelligence which is one of Howard Gardner's eight multiple intelligences. Democratic processes and learners' active roles characterise cooperative learning

environments. The teacher provides a high degree of organisation in forming groups and planning the structure of the lesson, but learners are left to manage interactions within the group (Arends, 2012:362).

Assessment and evaluation in cooperative learning requires a different approach to that which is used in direct instruction. Cooperative learning is primarily concerned with the development of social skills that enables cooperation and collaboration. Learners should be assessed and rewarded both for individual contributions and the collective product. Assessing group endeavours lessens the detrimental competition that might result from comparing learners with their peers. Assessing group endeavours makes school-based learning and assessment resemble that found in real-life situations (Arends, 2012:422). Evaluation is based on the group report or presentation and teachers must reward the final result and the cooperative behaviour that produced it with each member's input to the final product being assessed (Arends, 2012:387).

3.3.6.2 Problem-based learning

Problem-based learning (PBL) is a constructivist approach that emphasises the importance of learning through experiential problem solving (Major & Mulvihill, 2018:1). PBL, also known as problem-based instruction, authentic learning, and anchored instruction, is a method of instruction that builds up learners' knowledge and problem-solving skills through authentic problems (Pecore, 2012:8). PBL is both problem-centred and learner-centred. Problem-based learning recognises the importance of learners participating actively learning in authentic situations which offer tasks and problems that represent everyday practice and that are within contexts outside schools (Munby, Hutchinson & Chin, 2007:541; Major & Mulvihill, 2018:1).

PBL is rooted in the work of Dewey (1916) who proffered a view of education where schools reflect that the larger society and classrooms are laboratories for real-life inquiry and problem-solving. Dewey urges teachers to engage learners in problem-oriented projects and help them inquire into important social and intellectual problems. Dewey argued that learning in school should be purposeful rather than abstract and that purposeful learning is best achieved by having children learn in groups doing projects of their choice and in which they are interested (Arends, 2012:400). PBL also rests on the theory of constructivism by Jean Piaget and Vygotsky. Cognitive constructivism puts forward, as Piaget did, the notion that

learners of any age should be actively involved in the process of constructing knowledge and their own understanding. Knowledge is not inert but is dynamic as learners deal with new experiences that force them to construct and revise previous information.

Vygotsky attached greater significance on the social part of learning. Vygotsky's ideas are important to education because of the emphasis they put on social interactions during learning. Appropriate challenges and assistance from teachers or more capable peers scaffold learners to moved forward into their ZPD where new learning occurs (Munby *et al.*, 2007:542; Arends 2012:400).

Problem-based learning, characterised by open, democratic processes and by active learner roles, is autonomous learning that also encourages teamwork. It promotes inquiry, collaboration, and active participation of the learners and encourages higher-level thinking in problem-oriented situations, as well as meta-cognition. It is an alternative to teacher-centred approaches as it challenges learners with active-learning in authentic situations. In PBL, learners analyse and describe the problem, build up hypotheses, make predictions, gather and analyse information, carry out experiments if necessary, make deductions and draw conclusions. Learners are required to produce artefacts and exhibits that make clear or reflect their answers. The products could be in the form of a debate, a report, a physical model, a video, a computer programme, or a learner constructed website and are an alternative to the traditional forms of paper and pencil. Learners demonstrate what they have learned by planning for the artefacts and exhibits. In problem-based learning, learners work together in pairs or small groups. Working with one another offers motivation for continued participation in complex responsibilities and it increases opportunities for mutual inquiry and dialogue, and for the growth of social skills (Arends, 2012:397).

PBL develops learners who are analytical and who can solve problems by cooperating with others. Learners learn diverse methods of looking for information, expand ways of organising new information and arrange themselves as a group to generate practical answers to a problem (Major & Mulvihill, 2018:3). PBL also incorporates elements of apprenticeship.PBL aims at the development of understanding of problems in the environment of the learners. Learners also learn future roles by experiencing problems inauthentic situations. Learners also become independent and autonomous. An enduring effect of PBL is that learners develop strong valuable skills of communication (Ellis, 2007:308; Arends, 2012:400).

PBL helps in developing an informed citizenry in democratic spaces. PBL emphasises active learning, an inductive orientation, and learner development of their own knowledge. Teachers do not provide ideas or theories to learners, but they ask learners questions and encourage learners in arriving at their own ideas and theories (Arends, 2012:402). Helping learners become self-regulating learners who are self-assured of their own academic abilities, requires learners to be actively involved in an academically safe and secure learning environment. Teachers and learners go through the steps of a problem-based learning lesson in a rather prearranged and conventional way, but the standards contiguous with the lesson are those of open investigation and liberty of deliberation. The role of the teacher is to facilitate the learners whose role is emphasised, in the PBL processes. The teacher guides and assists learners in progressing through each of the consecutive iterative stages of their dialogue and judgement making. The teacher refrains from providing information but becomes the "metacognitive coach" who prompts learning discussion and interaction amongst learners (Major & Mulvihill, 2018:2).

Assessment procedures are tailored around the goals the teaching is intended to achieve. Performance assessment is used to measure learners' problem-solving potential as well as group work. Learners are assessed and rewarded for both individual and group work. Assessment tasks in problem-based learning do not consist only of paper-and pencil tasks as checklists and rating scales can be used to measure the work products created by learners. Pre-tests can be used for assessing reading and other language growth areas. Assessment strategies that require learners to complete problem-solving tasks to identify their capability to gain from certain kinds of instruction, are also used (Arends, 2012:422).PBL creates opportunities for developing important dispositions in learning. Learners who learn through PBL are said to be eager to pass examinations and are motivated to learn. Learners want to be able to put into practice the material they are learning. Learning is more meaningful when learners are able to apply their knowledge and connect in solving authentic situations (Major & Mulvihill, 2018:3).

3.3.6.3 Classroom dialogue and class discussions

Dialogue is central to instruction, although it's not considered a teaching approach. Dialoguing can be a procedure or strategy used by itself or across a variety of methods of instruction. In most lessons, dialogue predominantly takes place in small groups during cooperative learning lessons. Dialogue basically depends on interactions with others.

Learning results from interactions created in a democratic dialogue that is directed to the formation and gaining of new information which is produced by agreement. Dialogue requires the maximisation of the use of communication abilities in any context and a more active, reflexive, and critical participation. Constant dialogue is required in PBL to achieve the instructional goal of the model (Racionero & Valls, 2007:548).Dialogic learning depends on the interrelations between learners in heterogeneous groups helping each other find a joint resolution. There are no differences between one who knows more or less on the topic. Dialogic learning results in better learning in terms of elaboration and because all of the learners learn. Egalitarian and reflexive dialogue develops capacities with more depth than the usual forms of teaching (Racionero & Valls, 2007:556).

Dialogic learning takes place in democratic environments. Learners make contributions of their knowledge which are based on their experiences and skills on an equal basis with the intention of understanding based on shared agreements. The learners create learning through interactions based on solidarity, something which would not be possible in solitude (Racionero & Valls, 2007:548). When a learner explains to another how to resolve an activity, he or she reinforces what they know and then consolidates it. The organisation of classrooms in interactive groups helps learners assist each other in learning (Racionero & Valls, 2007:556).

To live together in society on the basis of equal rights, humans need to talk to each other and come to some agreement (Aubert & Soler, 2007:521). Spoken language makes it possible for learners to converse about what they already know and to form meaning from new information as needed. Dialogue between teachers and learners creates the social glue that holds classroom life together. Spoken language has an effect on the thinking processes of learners and gives them their distinctiveness as learners and as members of the classroom group. A strong connection exists between language and thinking, and this leads to the development of capacity to analyse, to reason deductively and inductively and to make sound inferences based on knowledge. Discussion can be used to improve learners' thinking and assist them in building their own meaning of academic content. Discussion helps learners to reinforce and widen their knowledge of the topic and increase their capacity to think about it. Thinking out loud also provides learners with opportunities to talk about and occupy themselves with their own thinking and to learn how to regulate their own belief processes. Learners actively build knowledge as they construe new knowledge and put it together with

prior knowledge. Discussion provides a means for teachers to view the thinking skills of their learners and to give feedback when they observe faulty and incomplete reasoning. Discussions provide settings in which a teacher can help learners to discover important communication abilities such as clarity of expression, paying attention to others, reacting to others in suitable ways, and posing good questions (Arends, 2012:431). Through dialogue, learners get to know that all elements of critical thought, such as interpretation, questioning, trying possibilities and demanding rational justification, are socially valued (Arends, 2012:433).

The grading of classroom discussion can be a daunting task to teachers. It is difficult for teachers to calculate participation in a dialogue in a satisfactory way. But if participation is not evaluated, learners may view participation in dialogue as less important than work for which a grade is given. The teacher faces the dilemma of whether to reward quantity or quality. The teacher can confront the grading dilemma by giving extra points to learners who constantly are ready for discussion and who make important contributions. Discussion can also be used in place of a reflective writing assignment. The grade in this example is given not for participation but for the learner's ability to reflect on the discussion and put into words what the discussion meant to him or her (Arends, 2012:456).

3.4 THE NEW APPROACH IN ZIMBABWE

The New Approach is a policy guideline that was adopted in Zimbabwe's educational system in the 1970s. The New Approach was launched as a result of the recommendations of the Kerr Commission (1952) and the Judges Commission (1962). Child (1965:19),one of the pioneers of the New Approach, said that educators were not satisfied with the traditional teaching approaches that were being used at the time. The two commissions identified weaknesses in the teaching methods under the traditional system of education that was being practiced in colonial Zimbabwe. The Kerr Commission reported on the lack of resources in the schools and the lack of creativity on the part of the teachers. The Judges Commission confirmed the findings of the Kerr Commission and also reported that learners were passive and sat in closely packed rows. A primary school inspectors' report carried out by the Ministry of African Education in 1963 also noted weaknesses in teaching methods.

The traditional classroom had a very poor learning environment. The classrooms were small, poorly built and unattractive. The schools suffered from a shortage of resources. The classrooms had bare and unattractive walls. There was a general shortage of furniture.

Learning activities were restricted, and learners were forced to sit still all the time. There was a high failure rate and the "cold formal" education methods greatly retarded children's social development (Siyakwazi & Siyakwazi, 2012:6). The Judges Commission recommended the improvement of methods of instruction, and teachers' conditions of service. One of the commission's recommendations was the move to train teachers in the freer methods of primary school teaching, a situation that necessitated transformation of the schools.

The Ministry of African Education granted the Hope Fountain permission to carry out an experiment on infant teaching based on the progressive pedagogy of infant education under the name 'New Approach'. Hope Fountain is one of the oldest missionary institutes in Colonial Zimbabwe. The experiment was pioneered by MacD Partridge, Joyce Child and Joana Moyo Sibanda. The experiment focused on using English as the language of instruction in the infant class as well as introducing child-centred infant methods of teaching in African schools. The intention was to help learners become more effective learners and to promote more effective learning in the classrooms. The focus of the experiment in all subjects was on learning and not teaching. Learners spent time talking to one another in pairs or in groups. Learners using English, practised sentence patterns, learnt in oral work and in arithmetic, provision was made for playing games (Secretary for African education's Report, 1962:19).

The Hope Fountain experiment and its results attracted national attention. The government accepted the New Approach and it was introduced throughout the country. The New Approach, which embraces 'new' pedagogical teaching approaches, is essentially constructivist, reflecting social constructivism (Siyakwazi & Siyakwazi, 2012:32). The New Approach attaches great importance to the nature of learning activities, the social settings, the sequence of learning events and the language development of learners. The New Approach is opposed to some of the traditional teaching practices that are often still prevalent in schools. Before the New Approach, schools relied on traditional teaching frameworks grounded in behaviourist and cognitivist theories of teaching and learning. Behaviourist and cognitivist teaching approaches focused on performance rather than on the reasons that prompt learners to respond or act in a particular way (Jordan *et al.*, 2008:32).In contrast, the New Approach focuses on cooperative teaching and learning and a broadened concept of the teacher's role. The approach is against the authoritarian teacher and requires the teacher to be a diagnostician, a group leader, a guidance counsellor, a resource manager, a therapist and a community leader, as well as an instructor (Siyakwazi, 2014:13).

According to the philosophy of the New Approach, schools are expected to be committed to learner-centred education, with principles and guidelines putting the learner at the centre of the learning process, thus teaching is learner-centred and less teacher-dominated. Learner-centred educational practices are suggested because of the helpful influence that they have on learner motivation, achievement and understanding (Zeki & Guneyli, 2014:1). The schools are to take into consideration the concerns of the learner in all its complexity, his or her interests, needs, desires, feelings and attitudes. The New Approach condemns passive learning by memorisation and of factual data (rote learning). The approach is against teaching approaches that involve force-feeding or spoon-feeding. (Siyakwazi, 2014:14). The New Approach encourages groupwork and learner involvement. To facilitate group work and discussions, learners sit in groups instead of rows. However, working as a group does not mean that individual work is not valued. The teacher is expected to encourage individual independence in learning. The approach encourages the use of learning aids and play-way activities that promote learning. Teachers are encouraged to use learning aids regularly to help learners to learn and physical classroom spaces change from bare walls to walls with charts and creative corners. Learners are to be able to move and talk freely to one another (Siyakwazi & Siyakwazi, 2012:32)

3.5 SUMMARY

The purpose of this study was to examine the perceptions of primary school student teachers regarding the practical application of constructivism in learning. This chapter discussed constructivist theory, major proponents of constructivism and the classroom application of constructivism. Constructivism is a relatively new theory of learning. the reviewed literature made apparent the strengths or advantages of using constructivist approaches in learning and teaching. Constructivism stands in contrast to traditional approaches to learning focusing on the individual learner and the learning process. The perspective is premised on the belief that knowledge is subjectively and individually constructed by the learner as constructivists believe that human beings make sense or meaning out of information and experience in their own way. Each person is unique in his or her own nature and nurture, perceives, feels and thinks about things differently. Constructivists emphasises the importance of consciousness, free will, and social influences on learning. Constructivism lays the theoretical foundation for learner-centred education where teachers play a facilitatory role and learners participate actively in the learning process. Constructivism supports the development of knowledge and skills needed by learners to operate effectively in the twenty-first century. Constructivist

learning and teaching methods enable learners to manage information or knowledge, rather than the mere transmission of information to learners. Central to constructivism is the notion that learners must work towards constructing their own meaning by testing new knowledge against reality and further constructing meaning as a result. Constructivism provides a rich learning environment that enables learners to develop a range of skills. It provides contextual context, opportunities for practice, discussion and feedback. Constructivism leads to efficient and deep learning and aligned with learner-centred approaches, caters for individual differences maximising learning and helping all learners reach their potential becoming independent and lifelong learners. Learner-centred education allows learners to be educated to higher levels which benefits economic competitiveness, political systems and social cohesion by creating better informed leaders, voters and individuals who are able to thrive in an increasingly complex digital world. The next chapter gives details on the research design and methodology that the researcher used to answer the research question

CHAPTER FOUR

RESEARCH DESIGN AND METHODOLOGY

An unexamined life is not worth living. Socrates

4.1 INTRODUCTION

Constructivism is a theory that establishes a new partnership between the teacher and the learners. The constructivist approach values the voices, opinions and ideas of learners. This study is important because it proposes to bring about improvement in teaching and learning, especially in Zimbabwe. No matter how effective current practices are in some classrooms, there is always room for improvement. Teachers need to study and learn about different learning paradigms and try different approaches in their classrooms. Teachers also need to examine their own belief systems about instruction so that they believe that all learners can learn. It is also important for teachers to understand the relationship involving traditional approaches and the many dimensions of constructivism.

The focus of this chapter is centred on the design and methodology concerning the research conducted on student teachers' perceptions of the practical application of constructivism in teaching and learning through the New Approach in Zimbabwe. The choice of the research paradigm, research design, research approach, data collection methods and presentation, trustworthiness and ethical considerations are discussed in this chapter.

4.2 PROBLEM STATEMENT

The focus of this study is on the perceptions of primary school student teachers with regards to the practical application of constructivism in Zimbabwean classrooms. Constructivist learning includes cooperative and collaborative as well as individualised activities. Constructivist approaches are seen as developing learners who are actively engaged in their own learning, providing them with the skills they need to function in the twenty-first century. The use of constructivist approaches in the classroom helps learners to become independent thinkers and active participants who are able to extend their own learning. Learners will able to build up lifelong learning skills and strategies that will help them to apply knowledge in situations outside the classroom.

In Zimbabwe, education curricula and teaching methods are changing. In the 1970s Zimbabwe adopted the New Approach, which is essentially constructivist, as a policy guideline. Research suggests that constructivism is a better way to teach as it emphasises learner-centred classroom practices. However, change has been slow even with policy changes and teacher-dominated classroom practices are still dominant in the schools. Shifts in paradigms always bring in new points of view, new notions and new philosophical orientations. Teachers and learners do not adjust easily to changing ways of teaching and learning and attitudes and experiences about education are not easy to transform. It is difficult for teachers to let learners be responsible for their own learning and in addition, learners find it easier to depend on their teachers to 'spoon-feed' the information.

Teachers' thinking about teaching and learning affects classroom practice and their ability to change. A teacher's thinking about teaching and learning explains how the teacher reflects and acts as a teacher. Teachers should to scrutinise the beliefs that influence their decisions about teaching and learning for transformation to take place. Teachers hold different perceptions and beliefs about constructivism. Only when they change their beliefs about teaching and learning, will teachers be able to change their practice. Studying student teachers' perceptions about constructivist teaching and learning gives student teachers the opportunity to think about teaching practices and develop a sound base for best teaching practices. It will also assist teacher educators in adapting their way of presenting constructivist approaches in the curricula to make it more practical for application in the schools.

4.2.1 Main Research Question

With reference to Chapter One, the major research question is repeated. The research question that guided this study was *How do primary school student teachers perceive the practical application of constructivism in teaching and learning?*

4.2.2 Sub-research Questions

1. What does the practical application of traditional approaches entail in teaching and learning?
2. What does the practical application of constructivism entail in teaching and learning?
3. How can primary school student teachers be assisted in applying constructivist principles in the classroom?

4.2.3 Main Aim

The main aim was to study the perceptions of primary school student teachers with regards to the practical application of constructivism in the classroom in order to assist them to apply the principles during their practical training and once they start their teaching career.

4.2.4 Objectives

Research was done through a literature review and an empirical study.

In the literature review research was done on:

1. The practical classroom application of traditional approaches (behaviourist and cognitivist) in teaching and learning.
2. The practical classroom application of constructivism in teaching and learning.

The empirical research covered the following aims, namely to:

1. Explore primary school student teachers' views about the place of traditional approaches in teaching and learning.
2. Explain primary school student teachers' perceptions about the place of constructivism in the classroom.
3. Give guidance to primary school student teachers on how to apply constructivist principles in teaching and learning.

4.3 RESEARCH PARADIGM, DESIGN AND APPROACH

Research designs are plans and actions for research that vary from wide statements to in-depth processes of data collection, analysis, and interpretation. The plan involves numerous decisions. The general decision entails making a choice on the approach to be used to learn about a topic. The choice is enlightened by the philosophical suppositions a researcher carries to the study, actions of inquiry, and precise research methods of data collection, analysis and interpretation. Research design, research approach and research methods are three important conditions that stand for a point of view about research that presents information in a consecutive way from the wide arrangement of research to the narrow actions of methods (Creswell, 2014:3; Maxwell, 2019:2).

In this study the research paradigm deemed most appropriate for underpinning the study was the interpretivist-constructivist.

4.3.1 Research Paradigm

A research paradigm is a broad philosophical orientation regarding the world and the character of research that a researcher carries to a study. A paradigm is a fundamental set of beliefs that directs action. A paradigm can also be referred to as a worldview, epistemology and ontology or a broadly conceived research methodology (Creswell, 2014:5). A paradigm emerges on the basis of a discipline's orientations, student's supervisor or tutor preferences, and past research experiences. The kinds of beliefs which an individual researcher holds based on the issues pointed out above, will frequently lead to the taking on of qualitative, quantitative, or mixed methods approaches. In research, philosophical ideas remain largely hidden but they need to be identified because they influence the practice of research. The larger philosophical ideas espoused in the research must be made explicit. Such information helps to explain why a particular research method has been chosen. A researcher needs to reflect on the philosophical assumptions, the research design associated with the paradigm and the explicit methods or measures of research that transform the approach into practice (Creswell, 2014:4).

A researcher can choose from a number of paradigms to use depending on the researcher's ontology and epistemology. The ontological question endeavours to infer the structure and character of reality while the epistemological question is about researching the relationships between the researcher and the researched. The methodological issue seeks to establish how the researcher can get on with the research. It seeks to establish the methods that can be used for studying reality. In this view, research processes are in the end based on, and resultant from paradigms. On the other hand, paradigms are viewed as having connotations for research methods (Punch & Oancea, 2014:17).

There are many types of paradigms which can be used in studies. The paradigms that are extensively talked about in literature are postpositivist, constructivism-interpretivism, transformative and pragmatism (Creswell, 2014:8). The constructivist-interpretivist paradigm was adopted to guide this study. Constructivists-interpretivists are also referred to as social constructivists. Social constructivists suppose that individuals try to find meanings of their environment and build up subjective understandings of the events around them. The meanings are diverse and numerous which directs the researcher to look for the intricacy of observation instead of reducing understanding into a few types or lines of thought (Creswell, 2014:8).

Constructivism stresses the active construction of knowledge by humans (Ormston *et al.*, 2014:13). Basically, the constructivist paradigm assumes that people socially construct knowledge by being active in the research process. Realities are local, specific and constructed and are dependent on the individuals or groups that hold them. Golafshani (2003:603) indicates that "Constructivism is the view that all knowledge, and therefore all meaningful reality, is contingent on human practices being constructed in and out of interaction between human beings and their world and developed and transmitted within essentially social context". Efforts to understand the complex world of the lived experiences should be made from the point of view of those who live in it (Mertens, 2010:16; Punch & Oancea, 2014:18).

The interpretive approach systematically analyses socially significant action by directly observing people in their natural settings in a detailed manner in order to reach meanings and understandings of how people construct and sustain their social world (Neuman, 2014:103-104). Interpretivism concerns itself with finding out how people interact and get along with each other. Interpretivism is associated with qualitative research methods because of the use of observations and field research by most qualitative researchers. Qualitative researchers value human interpretation of lived experiences and the importance of both the participant and the researcher's explanations and understandings of the phenomena being studied (Ormston *et al.*, 2014:11).

In this study, the researcher selected the interpretivist paradigm because in qualitative research, the researcher's work consists of producing an interpretation that makes sense for someone who has not seen or experienced the singular phenomenon under study (Maxwell, 2019:5). Interpretivism uses the hermeneutics principles in its approach (Neuman, 2014:103), which emphasises the carrying out of a very close in depth reading of content to attain an insightful, profound meaning. Content can imply a dialogue, written account or pictures. Fuller understandings that are entrenched inside the content are exposed through reading. People who read bring their own biased understandings to the text. Accurate understanding can only be arrived at through a thorough study of the content, by considering its innuendos, and looking for linkages between its components (Neuman, 2014:103). Constructivist research aims at relying to a large extent on the participants' observations of the phenomenon under study. The use of open and general research questions enables participants to build the understanding of a phenomenon that is formed in interaction with others. Constructivist

researchers prefer open-ended questions because they enable one to carefully listen to what people say or do in their life environment. The understandings for the most part, are arrived at socially or historically. Constructivists' centre of attention is the precise environment in which people interact in order to get the meaning of the historical and cultural background of the participants. The background of the constructivist researcher shapes interpretation and so the researcher locates himself or herself in the research to acknowledge bias from his or her personal, cultural, and historical understandings (Creswell, 2014:8).

The location of the study within the constructivist-interpretivist paradigm is appropriate because constructivism emphasises the construction of knowledge by the participants and interpretivism stresses the importance of observations and explanations in perceiving the social world (Ormston *et al.,* 2014:13). This study focuses on understanding the perceptions of student teachers and aims at, amongst other things, providing, within the research process, a way and medium for the articulation of student teachers' views and understandings of the practical application of constructivism in teaching and learning. The approach looks for, listens to and outlines the voices of the student teachers.

4.3.2 Research Design

The research design is the plan used by the researcher to find the answers to the research questions. Creswell (2013:49) says a "research design means the plan for conducting a research". Ravitch and Carl (2015:66) also state that "qualitative research design is, basically, the way that you, as a researcher, articulate, plan for, and set up the doing of your study". McMillan and Schumacher (2010:490) define a research design as "the plan that describes the conditions and procedures from collecting and analysing data". A research design provides the overall structure for the procedures the researcher follows, the data the researcher collects and the data analysis the researcher conducts (McCaig, 2010:30; Leedy & Ormrod, 2013:74; Punch & Oancea, 2014:142). It sheds light on how the study is to be conducted. It involves a set of decisions regarding the topic to be covered, the population, the research methods and the purpose of doing the research. A research design provides specific direction for a researcher during research. It is a plan of answering that ensures reliability and viability of the research (Maxwell, 2019:2).

The research design can be conceived primarily as a typological and as a linear sequence of actions, or steps, that are involved in planning or conducting the research. The typological meaning refers to selecting a particular type of design from an array of such types and using

the choice as a template or foundation for planning and conducting a study. In qualitative research, the type of research involved may be philosophical or methodological. Denzin and Lincoln (2000) state that "the positivist, postpositivist, constructivist, and critical paradigm dictate with varying degrees of freedom, the design of a qualitative research investigation". Creswell (2013) described five such approaches in terms of both their philosophical assumptions and their methodological preferences. These are narrative research, phenomenology, grounded theory, ethnography and case study. As to the linear approach, Creswell (2013:5) stated that "by research design, I refer to the entire process of research from conceptualizing a problem to writing research questions, and on to data collection analysis, interpretations, and report writing". According to Yin (2010:29), "the design is the logical sequence that connects the empirical data to a study's initial research questions and ultimately, to its conclusions".

The research design adopted for this study is that of a case study research design for a qualitative research approach. A case study is a common form of social research and is an idiosyncratic type of investigation. Miles, Huberman & Saldaña (2014:44) describe a case as a "phenomenon of some sort occurring in a bounded context". According to Yin (2014:16),"a case study is an empirical inquiry that investigates a contemporary phenomenon (the case) in depth and within its real-world context, especially when the boundaries between the phenomenon and the context may not be defined". Case research designs focus on studying real people in real circumstances and are extensively used in many disciplines like education, psychology, sociology, business and healthcare (McWhorter& Ellinger, 2018:185). Case studies, which have a holistic focus, endeavour to achieve a deeper understanding of the case in its natural setting by recognising its intricacies and its environment. They aim at preserving and understanding the completeness and harmony of the case (Punch & Oancea, 2014:148).Case studies can be of just one case or of several. Case study research is well suited for a qualitative research approach, since it encourages interpretation and allows for complexity and a richness of detail. Case studies provide rich and thick descriptions about the phenomenon which can be used to elucidate the researcher's understanding of the event being studied.

Case selection is the foundation of qualitative inquiry. Case studies are bounded by time and activity. Qualitative research entails the choosing of the research site, time, people and events. The knowledge of the setting and accessibility to the site are vital ingredients in

determining whether the research will be carried out. Case study offers advantages of engrossment in rich data which may result in new ideas. Case study research can sharpen theory at hand by discovering missing links. It can also serve as clarification. Single cases can be very graphic and informative and are frequently used in qualitative research. Case studies use straightforward and many methods of data collection such as interviews, observations and archives (Schreier, 2018:92).

Case studies can be explanatory, interpretive, exploratory, descriptive and evaluative (McWhorter& Ellinger, 2018:186). Interpretive case studies also offer description but are used to build up conceptual categories or to show support, or dispute theoretical suppositions held earlier. The design for this study is a descriptive and interpretive case study. The researcher collected information about student teachers' perceptions of the practical application of constructivism in teaching and learning.

The research design in this study is a single-site case study of primary school student teachers at a teachers' college in Zimbabwe. The 'case" comprises primary school student teachers on teaching practice. Perceptions develop within particular contexts. In this study, the adoption of a case study design permitted the researcher to study the perceptions of the primary school student teachers in their environments and data was collected in those environments. The researcher did not influence or wield power over the behavioural patterns of the student teachers. The study, consisting of eight participants, permitted the researcher to have an in-depth scrutiny of each case. A wide range of the number of participants can indicate that the 'thickness' of the resulting interpretations or descriptions varies considerably (Schreier, 2018:92). It was significant that the data collected, and the theory developed during the subsequent analysis be grounded in the everyday fabric of the student teachers' practice and discourse. The immersion of data collection processes in 'real' classrooms in schools and using primary school student teachers' voices in the process of interpretation in schools and theory generation provided the space and opportunity for primary school student teachers to contribute to knowledge which itself is potentially an identity changing process. Focusing the research on a specific teachers' college is valid and worthwhile and can contribute to an understanding of educational practice. The researcher's experience as a lecturer at the targeted teachers' college proved helpful in many ways as he was able to develop a good relationship with the participants.

4.3.3 Research Approach

The research approach refers to the specific method that involves the forms of data collection, analysis, and interpretation that a researcher proposes to carry out his or her study (Creswell, 2014:14).Three different types of research approaches in social sciences can be identified, namely qualitative, quantitative and mixed methods types of research, which are marked by different methodologies and terminologies. Quantitative and qualitative approaches emanate from unlike philosophical assumptions that form the way researchers reach problems, gather and analyse data. They represent very different ways of thinking about the world and are situated at two different ends on a continuum. Mixed methods exist in the centre of the continuum because it integrates essentials of both qualitative and quantitative approaches. Quantitative and qualitative approaches are better understood by being contrasted against each other. The following section examines the two approaches in an effort to draw out the distinction between them. It is important to have an understanding of the two approaches and the logic that drives each. The reviewing of the qualitative is more detailed because it is the approach selected for this study.

4.3.3.1 Quantitative research

Quantitative research originated in positivism, along-established scientific method of carrying out research. Quantitative research makes use of special terminology and set of techniques based on its goals. Quantitative research investigates precise and well-defined questions that look at the association involving events, or incidences. Quantitative research's main goal is to capture precisely particulars of the empirical social environment and communicate what is established in statistics. The approach seeks to exercise a high level of power over the diverse variables that may have an effect on the relationship between events and as such, it recruits respondents randomly. Quantitative research makes use of hypothesis testing, and objective data collection to reach results that are systematic, generalisable, and open to replication by other investigators (Ary *et al.,* 2010:23). Quantitative data is frequently collected by means of surveys and questionnaires that are systematically drawn up and prepared to give numerical data that can be investigated statistically and give results that can be generalised to a number of bigger populations. The reporting of quantitative data is done using descriptive statistics such as the mean, median, mode, range, and standard deviation. A variety of pretest-posttest comparison group designs are also used (Ary *et al.,* 2010:421).

4.3.3.2 Qualitative research

The researcher, in this study, used a qualitative research approach to collect, analyse and interpret data. Qualitative study is a holistic and in-depth approach that limits itself to a few instances or units. Qualitative research allows the examination and perception of intricate issues (Schreier, 2019:2) and is based on different philosophical approaches to those of quantitative research. Qualitative research is more fluid and linear (Neuman, 2014:203) and is anchored on an epistemological dedication to a human-centred approach to doing research which emphasises the significance of understanding how people feel about their environment and how they interact in it. The cardinal principles of a qualitative approach consist of collection of data in situ, and exploration of meanings than behaviours in an inductive way (Given & Winkler, 2014:4). The focus of qualitative research is on the depth, detail, and context of the researched phenomenon. Qualitative research maintains that knowledge is socially built and cannot be separated from people's histories and cultural origin.

When doing qualitative research, the researcher identifies the group or setting that is to be studied rather than identifying specific variables. The researcher tries to comprehend the meanings individuals or groups attribute to social or human problems. The researcher captures the individuals' or group's meanings such as their thoughts, feelings and behaviour in narrative format, rather than by way of numbers. The understanding of how individuals make sense of their world is gained by asking them in a straightforward way about what they think to be significant about the topic under study. Qualitative researchers regard the individual and his or her environment to be interconnected that in effect, they co-exist. Qualitative research is holistic and focuses on the total picture and does not break it down into variables. Qualitative research's goal is to gain a deep understanding of the whole picture (Cooper & White, 2014:6; Creswell, 2014:103; Given & Winkler, 2014:4).

The search for meaning is directly related to the notion that meaning is socially developed by individuals as they interact with their environment, instead of recognising truth as a singular and fixed quality from which all understanding of the world comes. The findings of qualitative research may not be generalised partly because the approach looks for understandings and interpretations at a particular point in time and in a particular framework. In qualitative research, reality is not fixed, objective and a constant construct but is more fluid, ephemeral, and ever-changing (Cooper & White, 2012:6). The main concern of qualitative research is to find out how reality is arrived at than what the reality leads to.

In qualitative research, the researcher plays an important part. The researcher is part of the data collection instruments. Qualitative researchers must question their own assumptions, their prejudices, opinions, and frames of mind to come to an understanding of the relativity of answers in qualitative research, because it can never be totally objective. Qualitative researchers deem that the association between the researcher and participants is not a mutually exclusive relationship. They believe that background restrictions help to shape analysis (Cooper & White, 2012:15). Qualitative data is non-numerical - it can consist of images, videos, text and people's written or spoken words. Qualitative data is collected through observations, individual and focus group interviews, questionnaires, attitude scales, and the analysis of documents (Lodico, Spaulding & Voegtle, 2006:28)

Qualitative research investigates the nature of relationships, activities, situations or materials in a study where emphasis is on telling the goings-on or state of affairs. The samples of a qualitative research study are typically selected through purposive sampling thereby guaranteeing the samples are appropriate to the goal of the study. Therefore, it is feasible to get in depth information about cases or people by way of qualitative research. The purposive sampling course of action enhances understanding of the cases while reducing generalisations. It also ensures that researchers are not misinformed. Qualitative research also allows for triangulation of data collection methods. In terms of credibility, triangulation or using at least three different types of data, is more credible than using only one data source (Brown, 2007:489; Cooper & White, 2012:7). Validity is enhanced by gathering data from many diverse sources (Flick, 2018b:3). Qualitative reports reflect a dynamic, reflective and continuous process. The final report of qualitative research has a flexible structure and is a narrative report which is rich and comprehensive in order for the reader to understand the social reality experienced by the participants. Qualitative reports embrace context, bias and subjectivity (Miles *et al.*, 2014:324).

The qualitative approach was adopted for this study because of its effectiveness in studying human occurrences. The study is about investigating student teachers' perceptions which makes the qualitative research approach ideal. The approach is more amenable to examining student teachers' thinking, understanding and making sense of the practical application of constructivism in teaching and learning.

4.4 DATA COLLECTION

Data collection, a critical part of the research, is the systematic process of gathering information important to answering the main question together with its sub-questions, using a variety of tools. Data are the materials which result from communication with and in the field when people talk to a researcher. Data could be a compilation of information such as numbers, words, measurements, observations, or even just a narration of events. Data also result from observing participants' activities and from writing notes about what participants do and in addition, data also result from what a researcher selects as part of the process they document (Flick, 2018a:9). Data in research are important because they are a means of communication between the researcher and an audience or institution about the field and the insights that are available or produced. Data and its analysis provide a researcher with ways of communicating his or her contribution to understanding and changing routines and social problems in the field (Flick, 2018a:10).

Qualitative data collection involves the collection and creation of audio and/or pictorial material for analysing and understanding a phenomenon, social fields, subjective and collective experiences and the related processes of meaning-making which can refer to subjective or social meanings. Collection of qualitative data is also done to learn and explain topics in the field or arrangements and developments in customs and practices. The data collected can be naturally occurring or be elicited. It can be based on talking, listening, observing, analysing materials such as sounds images or digital phenomenon. Data collection can be through single or multiple methods. The aim of data collection is to arrive at materials that permit the production of a report by analysing and contrasting a variety of examples, phenomenon or cases (Flick, 2018a:2).The collection of appropriate data creates a good basis for drawing up the conclusions and recommendations of a study.

In this study, data were collected from studying the perceptions of primary school student teachers with regards to the practical application of constructivism in teaching and learning. Different instruments, regarded as tools to collect data, were used to collect data from the student teachers. A research instrument as a tool used to conduct research (Khan, 2008:97), is intended to measure knowledge, attitude and skills. The methods of collecting data and the strategies used to sample participants should be congruent with the research purposes and questions (Punch & Oancea, 2014:181). Data for this qualitative study were collected through semi-structured interviews and classroom observations. Data were first collected through a

review of related literature, then through observing lesson demonstrations of how each of the eight participants conducted their lessons and lastly, through eight interviews with the participants. Data from the lesson demonstrations and the interviews were gathered at the same personal meeting. The data collection process began with the sampling of the participants and visiting them at their respective practicum schools. During the lesson observations, the researcher took into consideration the teaching environment, teacher-learner relationship and seating arrangement and the data collected from interviews were meant to see if participants practices align with constructivism. Data from the interviews yielded narrative responses of the perceptions that comprised the data from the participants.

4.4.1 Literature Review

A review of literature is a summary of the available literature that discusses the theories and variables relevant to a study. According to Punch and Oancea (2014:120), a literature review is important in identifying the research topic within an area and helps in developing research objectives. A literature review provides the evidence and conceptual tools available to build an argument for the study. A literature review involves reading many studies in the area of interest that hold ideas and information applicable to the topic and experimental studies that have previously been carried out before. A literature review is important because it offers the justification and basis for doing a study, it arouses self-belief in the researcher and helps to let the readers of the study know that the researcher is well-read about the subject of interest (Wilson & Shauna, 2017:5). The goals of a review of literature are to demonstrate a researcher's awareness of a body of knowledge that already exists about the subject of research. A researcher is able to learn from and build on what other researchers have done. It helps to establish the credibility of the current research by looking at prior research to see that they link by integrating and summarising what is already known whilst learning from others and inspiring new ideas (Neuman, 2010:126). A literature review allows the researcher to ascertain what is known and not known about the topic of interest so that the contributions of the study can be compellingly articulated (Punch & Oancea, 2014:121; McWhorter & Ellinger, 2018:189).

The focus of this study is on exploring the perceptions of primary school student teachers with regards to the practical application of constructivism in teaching and learning. A review of existing and relevant literature of learning theories was carried out in Chapter Two and Chapter Three. The literature review provided the necessary theoretical background that

familiarised the researcher with content and concepts related to the study. Chapter Two was primarily concerned with defining and exploring the concept of learning theories that underpin traditional methods of teaching and learning and Chapter Three examined constructivism as an epistemology and as a learning theory.

4.4.2 Empirical Research

This section focuses on explaining how the participants were selected as well as the methods and procedures of how the data were collected.

4.4.2.1 Population

Ary *et al.* (2010:148) describe a population as all members of any distinct class of people, events or objects. The population of this study was the total number of primary school student teachers doing a Diploma in Education course at a selected teachers' college in Zimbabwe. The total number of primary school student teachers at the college, from first to third year for 2019, totalled 1800. The target population is the big group to which a researcher wishes to generalise the findings of the study, although its acknowledged that qualitative research cannot easily be generalised. The accessible population was the cohort of the2018-2020 group of primary school student teachers on practicums in the Midlands province. The accessible part of the population in this study were the primary school student teachers on practicums in Gweru, an urban area in which the selected teachers' college is located

4.4.2.2 Sampling

Sampling is the choosing of a research site, time, people, and events in the field (Miles *et al.,* 2014:29). The sampling process involves picking out smaller portions from a population for observation and analysis (Johnson & Christensen, 2004:197; Best & Kahn, 2005:12; Burns & Grove, 2005:233). A sample is a subset of the target population that the researcher wishes to study (Creswell, 2012:142). Samples in qualitative approaches are crucial because of the difficult nature of consulting all the people in a targeted population when gathering data for a study. Samples of individuals are representative of the entire population and permit an in-depth study of the subgroup. They afford researchers a lot more control over participants because collecting data from fewer cases means information allows for more detail and accuracy than when studying a whole population (Magwa & Magwa, 2015:63).

Researchers use either probability or non-probability sampling (Creswell, 2012:142). Non-probability samples are typically used in qualitative research and are used when it is not

feasible to apply probability sampling. Non-probability sampling involves the researcher selecting participants because they are available, convenient and represent what the researcher seeks to study (Creswell, 2012:145). Non-random methods for choosing participants of the sample are used in non-probability sampling. Participants are not chosen through chance procedures. The chances of every member in the population being in the sample is not guaranteed. The success of non-probability sampling depends on the researcher's judgment (Ary *et al.,* 2010:149-150). Convenience sampling, purposive sampling and quota sampling are the main types of non-probability sampling(Ary *et al.,* 2010:155). Participants for this study were selected through processes of purposive sampling, convenience sampling and stratified random sampling.

In this study non-probability sampling, which offers the advantage of convenience and a detailed collection of data (Oliver, 2010:109), was used. Purposive samples are used in qualitative research because they provide maximum insight and understanding of what is being studied (Ary *et al.,* 2010:428). The focus in qualitative research is on having a limited number of participants who are purposively sampled to participate because of their in-depth knowledge of an issue about which little is known. In this study, the researcher purposively sampled eight participants from the cohort of 2018-2020 primary school student teachers for the study. The researcher used his experience and knowledge to purposively sample the participants whom he believed could provide him with the relevant information about the topic for more in-depth study. Qualitative research relies mostly on purposive sampling where small groups or individuals that are likely to have the knowledge and information about the phenomenon of interest are selected (Punch & Oancea, 2014:210). Purposive samples are characteristically small because of the depth and extent of the information required in qualitative studies. The sample size is influenced by practical considerations of such things as time, money and availability of participants. A number of variations on purposive sampling are used in qualitative research which can be merged or blended within studies to meet various requirements for triangulation (Ary *et al.,* 2010:429). For this study, eight participants were purposively sampled because the participants had first-hand experience and had knowledge of the practical application of constructivism

Convenience sampling was used to choose the area where the research was carried out. Convenience sampling is a kind of non-probability sampling. In convenience sampling, members of the target population that meet certain practical criteria, such as ease of access,

nearness, ease of use, or enthusiasm to participate are incorporated for the intention of the study (Ary *et al.*, 2010:431; Punch & Oancea, 2014:211). The study was based on student teachers from a chosen teachers' college doing a general course programme in primary education. The student teachers carry out their practicum sessions in primary schools in and around Gweru for a period of three school terms and became the population from which the sample was drawn because the researcher is based in the same urban area. This made the study easy and affordable to carry out as the participants were readily available to the researcher. To maximize impartiality, the researcher recused himself from supervising student teachers in Gweru.

Stratified random sampling was used to select the participants from the convenient sample. In stratified random sampling, the population is divided into two or more groups or strata according to some attribute. It is appropriate for largely homogenous populations. Stratified random sampling ensures that subgroups are represented so as to adequately reflect the balance of different constituencies within the population (Mertens, 2010:322).The participants were sampled by dividing the population of second year general course student teachers according to gender in order to achieve representation of both genders in the sample group. Simple random samples of four participants were taken from each stratum and then combined to produce the desired sample of eight participants. Random selection is done to ensure representativeness. In random sampling, every member of the target population has an equal chance or equal probability of being chosen to be in the sample (Punch & Oancea, 2014:302). Simple random sampling is the purest and typical method for coming out with a sample from a population for a variety of purposes. Simple random sampling assures each member of a population an equal chance to be selected for the sample. Simple random sampling eliminates partiality from the process of coming out with the participants and achieves representative samples (Mertens, 2010:318).

A table of random numbers, which is a set of assorted digits, was used to conduct random sampling in each stratum. A table of random numbers that guaranteed that all the digits (0-9) had the same probability was created by a computer programme. A random number table more often than not holds five-digit numbers which are set into rows and columns to make it easier for reading. A full table may extend over as many as four pages. The use of a random number table guaranteed that all members of the population have the same chance of being selected for the sample group.

There were approximately 300 second year general course student teachers doing teaching practice in Gweru. The researcher received a copy of the list of student teachers from the teaching practice office of the selected teachers' college. The list was divided into two, based on gender. Each student in each gender group was allotted a digit from 001 to 150. A starting point was randomly selected for each group between 001 and 150. The researcher read all three-digit numbers between 001 and 150 moving across columns until four numbers were selected for each subgroup. The four numbers from each subgroup were combined to come out with the eight desired participants (four males and four females).

4.4.2.3 Observation

Observation is an essential means for collecting data in qualitative research (Ary *et al.*, 2010:370). Observation is an all-inclusive research approach which entails watching and describing actions in the natural environment (Gaudet & Robert, 2019:83). Observation offers the researcher the advantage of collecting data through direct contact in naturally occurring situations (Mertens, 2010:370; Cohen, Manion & Morrison, 2011:456). This allows the researcher to hear, see and experience authentic situations (Mertens, 2010:370). Observation allows for richly detailed description of the participants behaviours, intentions, situation and events. It helps in evaluating the things participants may be ignorant of or that they are reluctant or not capable of discussing in an interview. Observations also provide good opportunities of identifying unanticipated outcomes. The data which is collected through observation is more accurate than that which comes through direct questioning. In a normal situation, people act naturally.

Observation was made to gain a holistic and deeper view of the practical application of constructivism and for triangulation purposes. The researcher observed the student teachers engaged in teaching. Observations of classroom teaching helped the researcher to distinguish behaviour as it occurred in the classroom. Observing the student teachers engaged in different instructional practices gave the researcher the opportunity to take notes on the student teachers' behaviour as they practically applied constructivist principles in the teaching and learning process. The researcher was able to explore how the student teachers interpreted and made sense of constructivist principles in teaching and learning. An observation checklist was used to record the demonstration of participants' competences or behaviours in relation to their learning and development (Appendix J). The constructivist classroom activities were drawn on the basis of how they resembled a constructivist learning environment. The

activities are also part of the criteria and indicators for assessment of practical teaching guide followed by the college (see Appendix M). The activities maximise learner's participation and minimise downtime.

Qualitative approaches to observation are much more unstructured and observations are naturalistic and non-interventionist. The observers do not manipulate nor stimulate the behaviour of those being observed in a naturalistic setting. The researcher does not contrive the situation for research purposes. The behaviour is observed as the flow of actions and events unfurl in a more natural open-ended way (Punch & Oancea, 2014:196). Groupings and notions for the description and analysis of data observed emerge during analysis. They are not brought to the research site or forced on the data from the start. The attractiveness of observation is that it provides a reality check as sometimes what people do is different from what they say they do.

4.4.2.4 Interviewing

Interviews provided most of the data collected for this study. The interview is the most widely used and basic instrument for collecting qualitative data. An interview emphasises the social structure of research. In an interview, there is an exchange of views between two or more people directed by one on a topic of common interest (Cohen *et al.,* 2011:409). An interview is used to elicit the interviewee's understanding or point of view on a topic. Interviews are helpful in exploring people's opinions, beliefs, understandings and experiences about situations in their own words. Rubin and Rubin (2012:3) describe the power of interviews to enlighten research topics by saying, "When using in-depth qualitative interviewing … researchers talk to those who have knowledge or experience with the problem of interest. Through such interviews, researchers explore in detail the experiences, motives, and opinions of others and learn to see the world from perspectives other than their own". Interviews can give information that cannot be gained by observation and they can be used to confirm observations (Ary *et al.,* 2010:438), which was the case in this study.

The interview is valued because during the actual conversation, the interviewer and the interviewees "grasp for meaning" (Cohen *et al.,* 2011:409). Interviews also permit the researcher to ask about intricate issues and learn more about the background issues that influence individual understandings. They give discernment of participants' point of view, the understanding of events for the participants, knowledge about the place, and possibly knowledge on unexpected issues. An interview can quickly make available huge amounts of

in-depth data. Interviews allow instant follow-up and amplification of participants' responses. Interviews however, are time consuming to carry out and later to transcribe the information from audiotapes or any other sources (Ary *et al.,* 2010:438-439).

4.4.2.5 Types of interviews

Three main different types of interviews that may be used specifically as research tools can be identified, namely the structured interview, the semi-structured or partially structured, and the unstructured interview. The three types of interviews are reviewed below, but the emphasis in this study is on semi-structured interviews. Interviews in qualitative research are done with an unstructured or minimally structured format (Mertens, 2010:370).

The structured interview lies at one end of the continuum of types of interviews. The structured interview is organised with the intention of obtaining specific types information from interviewees. In a structured interview, the same set of questions are posed to each interviewee but with some latitude in the sequence (Ary *et al.,* 2010:438). Structured interviews are used mostly used in quantitative research.

Unstructured interviews lie at the other end of the continuum. The unstructured type of interview is conversational in nature where questions emerge from the context. The unstructured interview is at times expressed as 'a conversation with a purpose'. Unstructured interviews are difficult to conduct and to write up (Ary *et al.,* 2010:438).

Semi- or partially structured interviews are found in the middle of the continuum with regards to structured and the unstructured interview. Semi-structured interviews have features of both structured and semi-structured interviews and have the advantages of both methods of interviewing. Semi-structured interviews use both closed and open-ended questions. In semi-structured interviews, the area of interest is selected and questions are accordingly devised (Ary *et al.,* 2010:438). Semi-structured interviews include prompts and probes that permit the interviewer to clarify the questions and to request participants to offer comprehensive information or to explain their responses (Cohen *et al.,* 2011:278).The questions are characteristically open ended and the questions are intended to make known what is significant to know about the event under study (Ary *et al.,* 2010:438). Open-ended questions allow a dialogue with the participant, rather than having a simple question and answer session and the interviewer can change the arrangement of questions in the interview process to align with the direction in which the interview is progressing.

The researcher gathered data by interviewing eight participants who were on practicum in the schools. The interviews were carried out after the lesson observations with the student teachers. The observations and interviews were conducted within a four-week timeframe starting from 24 February and ending on 20 March 2020. The interviews focused on participants' personal accounts of their experiences when practically applying constructivist principles in teaching and learning. The researcher was guided by the interview protocol that is presented in Appendix I. A structured interview protocol ensured that the researcher was able to cover the same broad areas with each participant. This also assisted the researcher to compare the data across the participants. The researcher had a list of prepared general topics on the interview protocol that acted as probes. However, the questions and probes on the interview protocol were not all followed exactly as outlined. The interviews were carried out at the end of the school day in the classrooms of the participants. During the interviews, the researcher established a safe and comfortable setting for the participants so that they could openly state their perceptions of the practical application of constructivism. The interviews were hinged on getting the opinions of student teachers about how they understood and experienced constructivist instruction in real classroom situations.

The participants were given opportunities to elaborate or provide more relevant information as the interview progressed. The use of general open-ended questions allowed the participants' concerns and interests to surface which provided a broader lens for the researcher's regard. The researcher was led by the participants' responses to decide on the order of questions and the use of probes to further explore relevant points. Using semi-structured interviews allowed the researcher to seek clarity on certain questions whenever the opportunity arose; however, the researcher was consistent with all the participants. The interviews lasted for between30 and 40 minutes. The researcher remained diligently on lookout to reduce any personal prejudice that could threaten the truthfulness of the data collected. Interviews were recorded through audio technology, with participants' consent, for later transcription. Audio recordings were the preferred mode of data recording because they were less distracting and they offered a word-for-word record of the responses. All the interviews were later transcribed using Microsoft word at a convenient time to truthfully and correctly reproduce the responses of the participants to the interview questions (Appendix L). The data was authenticated by the participants who were asked to read over the transcriptions to broaden, simplify, and verify everything they found to reflect their perceptions.

4.5 DATA ANALYSIS AND PRESENTATION

Data analysis is the "heartbeat" of any research process (Henning, van Rensburg & Smit,2004:103). Data analysis is a demanding but stimulating phase of the research process. The quality of thinking of the researcher is evident in the analysis. It is a process that involves critical thinking and reasoning and needs a blend of ingenuity and methodical searching, a blend of motivation and meticulous discovery (Spencer *et al.,* 2014:270). Data need to be analysed so that ideas that shed light on a research question can emerge. The process of qualitative data analysis involves trying to find out, reducing and making sense of huge amounts of information. The information frequently comes from diverse sources and the organised material is studied so as to discern innate facts. The data are analysed from as many angles as possible (Pandey & Pandey, 2015:70).Qualitative research gives attention to describing and understanding people's social lives and the meanings that people bring to them as well as their interactions within the environment. The depth and intricacy of qualitative research means that social life can be analysed in many different ways. Therefore, there are also many points of view and applications in the analysis of qualitative data.

The primary source of data in qualitative research is verbatim accounts. In this study, data were gathered through interviews and lesson observations. Verbatim accounts were transcribed from the audio-recorded interviews and analysed qualitatively. Qualitative research has no clearly established rules or procedures for analysis of data. Qualitative data generally involves processes of labelling, organising and interpreting data into sets of codes, concepts, categories or themes. The main purpose of data analysis is to find common themes and contradictions and to compare findings with the review. A theme is some concept or theory that emerges from the data. The use of thematic analysis entails a number of underlying abilities or competences such as pattern recognition. Pattern recognition is the ability to see an outline in seemingly random fashion (Patton, 2015:541). In this study, the data were coded and categorised into themes following Tesch's method, as outlined in Creswell (2014:198). Tesch provides detailed guidelines to developing an organising system for unstructured qualitative data. Tesch (1990:142-145) identified eight principles of data analysis that hold true for most types of qualitative analysis. Tesch's method entails breaking down, comparing and examining the transcribed interviews. Table 4.1 below illustrates the eight stages of Tesch's coding method and the actions taken by the researcher in this study.

Table 4.1: Tesch's method and application to the study

Tesch's coding steps	Application to the study
1. Getting a sense of the whole by reading all the transcripts carefully. Ideas that come to mind can be jotted down as one reads through.	Good analysis often depends on understanding the data by the researcher. The researcher familiarized himself with the content of the interviews by going through all the transcripts. The transcribed texts were read repeatedly. Notes of the transcripts were made. Some ideas were jotted down as they came to mind.
2. Pick one document (for example, the interview) - the most interesting one, the shortest, the one on the top of the pile. Should go through it, reflect on what it is all about and get the underlying meaning. Thoughts should be written in the margin	The researcher focused on the transcript with the most relevant information and analysed the text. The researcher selected one interview from the transcripts, which was very interesting, one which was the shortest, and, one, which was on top of the pile. The researcher got a sense of the underlying meaning by reading through the transcripts. The researcher reflected on the meanings of the transcripts and wrote his thoughts in the margin.
3. Making a list of all topics and putting them into columns as major, unique, and leftover topics.	Notes were made in the margins and were used to group the information together. The groups formed the basis of drafted themes and subthemes. The themes were put into groups and arranged as major, unique, and leftover.
4. Taking the list back to the data and abbreviating the topics as the codes. Writing the codes next to appropriate segments of the text and see if new categories and codes emerge.	Coding is very important in qualitative research. It forms the foundation of what is to come later. The researcher revisited the text to identify and code information in order to allow for credibility. Labels were put next to pieces of data. Labels indexed the data.
5. Finding the most descriptive wording of each theme and turning them into categories. Lines can be drawn between the themes to show interrelationships.	A coding process was used to generate descriptive words. Themes were abbreviated as codes. Lines were drawn between themes to show relationships.
6. Making a final decision on the abbreviation for each category and alphabetising the codes.	The researcher created a table of the themes and made a final decision on the abbreviation of each theme. The codes were then alphabetised.
7. Assembling the data material belonging to each category in one place and performing a preliminary analysis.	The researcher grouped the material and data were reduced.
8. Recoding the data if necessary	The researcher went through the data again and necessary changes were made. Where necessary data were re-coded.

(Source: Creswell, 2014:198)

Coding enables the interpretation of data and the division of data into parts using a categorisation system. Data were analysed in-depth as strictly as feasible to the shape in which they were recorded.

The themes that emerge under each category are described in detail in Chapter Five. The final report is interpretive and descriptive in nature. The findings are thus presented in narrative format which largely depend on rich descriptive language with little or no statistical tables. Language is the focus of analysis (Gaudet & Robert, 2018:58) with filed notes and citations from participants being used.

4.6 TRUSTWORTHINESS AND CREDIBILITY

The criteria for rigour in qualitative research are trustworthiness and credibility (Mertens, 2010:18). Trustworthiness is an important concept in qualitative research and simply answers the question "Can the results be trusted?". Trustworthiness is the judgement of being trustworthy given to a research report by a reader (Gunawan, 2015:10; Korstjens & Moser, 2018:121). The criteria for quality that is applied in quantitative research does not apply in qualitative research. Trustworthiness has various descriptions and has several criteria. Lincoln and Guba's (1985) Four *Criteria for Trustworthiness* are widely accepted by many researchers as a framework for ensuring rigour in a research study and are credibility, confirmability, transferability and confirmability. Trustworthiness permits researchers to explain the qualities of qualitative research outside the confines that are characteristically use in quantitative research. Lincoln and Guba's constructs are the equivalent of terms such as validity, generalisability, and reliability which are used to denote rigour in quantitative research (Given & Winkler, 2014:7; Korstjens & Moser, 2018:121).Trustworthiness in this study was guaranteed by using Lincoln and Guba's constructs for the duration of data gathering, analysis and writing up the findings of the study.

Data were gathered using multiple methods. The use of multiple methods receives support from Flick (2018b:3) who notes that reliability and validity in qualitative research can be realised by triangulation. Triangulation involves the use of either many researchers, many sources of data, or many methods to corroborate the findings that emerge from the field. The idea behind triangulation is that the more accord there is of different data sources on certain issues, the more reliable the interpretation of data. Data for this study were gathered through classroom observations and interviews. The intention was to enhance the credibility and overall trustworthiness of the study.

4.6.1 Credibility

In qualitative research, credibility is analogous with internal validity in quantitative research. Credibility or truth value denotes the correct recognition of the phenomenon under study. It indicates how well the researcher has set up confidence in the findings based on the research design, participants, and context (Cho & Trent, 2006:324; Ary *et al.*, 2010:498). Credibility entails determining whether the findings of qualitative research are authentic from the perspective of the participants in the research process. Actions under observation are correctly observed by researchers combining deep and close attachment with the community of interest while maintaining sufficient distance from the phenomenon of interest under study.

In this study, credibility was established through prolonged engagement, constant observation, and triangulation. Prolonged engagement was attained by the researcher by staying in the field long enough to observe and get a full and accurate picture of the student teachers' practical application of constructivism in teaching and learning. The researcher spent adequate time to develop familiarity with the surroundings and background to test for misinformation, to develop trust and to get to know the data. The researcher only left the field when the themes and examples of constructivism in the teaching and learning process began to repeat instead of extending to thick or rich data. Throughout the interviews, the researcher gave confidence to the participants by supporting their statements with examples. The researcher used probes and follow-up questions to ensure that participants clarified their statements. At the conclusion of an interview, the researcher summarised what the participants had said and requested the participants to read the notes to see if they correctly reflected their position. The researcher sought clarification with the participants about the ideas that developed from analysing the data that had been gathered.

Triangulation, a near-obligatory method of confirming findings, was carried out. Triangulation aims at enhancing the process of qualitative research by using multiple methods. Basically, the intention of triangulating is to support findings by demonstrating that at least three independent procedures of it agree with it or at least do not say the opposite to it. When triangulating, information that has been compiled from different sources or methods is checked for uniformity of evidence across sources of data (Mertens, 2010:258; Miles *et al.*, 2014:299; Korstjens & Moser, 2018:122).Methodological triangulation was achieved by using various methods of data collection such as the use of interviews and classroom

observations. The recording of interviews provided material for reliability checks, transcription, and playback with a record of nonverbal cues to search for deeper meaning. The recording of interviews forced the researcher to be attentive and help in controlling the pace of the interview.

Persistent observation was achieved by developing codes, concepts and categories or themes that were of assistance in examining the characteristics of data. During the research process the researcher constantly perused the transcribed data, analysed them, theorised about them and corrected the ideas accordingly. The researcher recoded concepts and the main category and read through the data until the final theory gave the expected depth of insight.

4.6.2 Dependability

Dependability in qualitative research is equivalent to reliability in quantitative research. Dependability addresses issues of integrity and quality in qualitative research. Dependability also includes aspect of consistency. Qualitative researchers view consistency as the degree to which disparity can be followed or explained (Ary *et al.,* 2010:502).A researcher has to make sure whether the analysis meets the acknowledged standards. The primary issue is whether the progression of the study is dependable, logically stable over time and across researchers and methods (Miles *et al.,* 2014;312). The audit trail is the most important strategy required to guarantee dependability. The researcher is accountable for making available things used to compile data such as a complete set of notes on pronouncement made during the research process, research team conventions, reflective thoughts, sampling, research material adopted, emergence of the findings and information about the data management. This allows anyone auditing the study to track the research path. Dependability means that the findings of the study will be consistent. The procedures should provide roughly comparable findings under constant conditions on all occasions (Mertens, 2010:259; Miles *et al.,* 2014:312; Korstjens & Moser, 2018:122).

The strategies that were used to measure dependability in this study were using the intra-rate method, maintaining an audit trail, and triangulation. The researcher was the interviewer and an integral part of the data collecting process. The researcher coded data and recoded data and compared the two sets of data. A comparison of the two sets of coded materials was then made. The researcher used procedures that other researchers can repeat in further research. Raw data in the form of field notes, voice recordings and interview transcripts were gathered and stashed in retrievable form as part of the audit trail. Information is provided on the

sample of the participants, the sampling procedures, contextual descriptions and methods of data collection. This guaranteed dependability of findings. An audit trail was maintained which ensures a means by which others can find out how decisions and conclusions were made by following the researcher's findings. Audit trails also depict the distinctiveness of the situation (Ary *et al.,* 2010:502). Other researchers who may feel like undertaking a related research will also be directed by the audit trail. In this study, the researcher used overlapping methods of data gathering such as observations and interviews. The reliability of the data is enhanced if multiple methods result in similar findings. An independent third-party should be able to make use of the audit trail to scrutinise the researcher's study in order to substantiate the dependability of processes employed and to check up whether they are confirmable.

4.6.3 Transferability

Qualitative researchers talk of transferability rather than external validity. Transferability addresses the question whether the conclusions have any larger import. Transferability is the extent to which the results of a qualitative study can be used or generalised to other situations or to other groups. Transferability permits readers of the research to make conclusions by comparing and contrasting the research situation to their own. Readers should be able to see if the results fit or can be applied in other contexts (Ary *et al.,* 2010:501; Mertens, 2010:259; Miles *et al.,* 2014:314).The researcher provides a "thick description" of the participants and the research procedure so as to allow readers to assess whether the findings are transferable to their own context. This implies that it is the reader who makes the transferability judgement and not the researcher (Korstjens & Moser, 2018:122).

In this study, the researcher provided a rich account of the descriptive data. The researcher provided accurate, detailed and complete description of the context, the setting, time, place, the research question, theoretical framework, the participants, the sample, sample size, sample strategy, observation and interview procedure, interview questions and excerpts from the interviews. Such descriptions should assist the readers in determining transferability to their own contexts.

4.6.4 Confirmability

Confirmability in qualitative research is equivalent to objectivity in quantitative research. Confirmability is basically concerned about the relative neutrality and reasonable freedom from acknowledged researcher prejudice in processing and interpreting the results (Ary *et al.,*

2010:504; Miles *et al.,* 2014:311). Confirmability connotes that the influence of the researcher's judgement is minimised. The data should be traced back to their source, and the reason used to understand the data should be made clear (Mertens, 2010:260).The researcher needs to make safe the inter-subjectivity of the data. The interpretation should not be based on the researcher's penchants and opinions but should be grounded in the data. The focus is on the process of interpreting the data during analysis (Korstjens & Moser, 2018:122). Yin (2011) referred to this as providing a "chain of evidence". The audit trail is the most important line of attack for indicating confirmability. The confirmability trail can be carried out at the same time with the dependability audit (Mertens, 2010:260). A complete confirmability audit trail should enable other researchers to reach similar conclusions using the same data and context. Additional approaches that can be used to ensure confirmability include triangulation of methods, peer review and reflexibility.

In this study, the researcher provided information about the participants, the sampling process, description of the context, data gathering methods, and data analysis procedures that can be assessed by other researchers. The trail should enable interested parties to attest whether the findings are reasonable resulting from and entrenched in the data that were gathered. Triangulating of data gathering methods such as observations and interviews was also done. It is difficult to completely eliminate the researcher's identity, values, and beliefs from the process of analysing data. Researchers should at all times strive to maintain objectivity or confirmability and integrity (Mouton, 2002:240). The researcher tried as much as possible to remain impartial to responses of the student teachers. The researcher tried to put aside all preconceived notions about the participants' ability to practically apply constructivism in teaching and learning in order to achieve confirmability.

4.7 ETHICAL CONSIDERATIONS

Ethical research is concerned with researcher responsibility and to keep away from harm those participating in the research. Ethical considerations play a very important role in qualitative research. Ethics should be placed at the centre of all research activities from the early stages right through to reporting and beyond. Qualitative research entails getting in touch with human participants in the field and that means issues of ethics are present and need to be addressed (Silverman, 2010:152). Ethics are sets of moral principles that are recommended by an individual or a group of people, which are then widely accepted. The principles proffer regulations and behavioural expectations regarding the most proper manner

of behaving towards experimental subjects and participants, employers, sponsors, other research assistants and students (de Vos *et al.*, 2012:114). Good ethical conduct means being able to foresee what might happen, reacting to the unforeseen and operating in a considerate and insightful way. Flagrant abuse of research participants in the sciences has led many universities to establish codes of research ethics. The main beliefs of proper ethical performance are constantly affirmed in the research methods literature and in many guiding principles, regulations and frameworks that have been developed. There is a wide agreement at a high level of thinking about what ethical research entails. Three main beliefs direct research namely respect for people, beneficence and fairness (Gaudet & Robert, 2018;122).

Respect for persons is a moral absolute (Gaudet & Robert, 2018: 123). Respect for persons indicates that all participants must be treated with courtesy. The notion of free and informed consent and the right to anonymity must be respected rigorously. Participants must be fully informed of the study prior to their participation. Beneficence pertains to creating studies with a high potential for important scientific discoveries and a low potential for harm to participants. Researchers must always consider ways to minimise harm. Participants must be handled as an end and never as a means. They must not be treated merely as an instrument for the achievement of the researcher's ambitions. Justice indicates fair and equal distribution of both positive and negative aspects of the study to all people. It is extremely important that each human being be treated in a fair way; for instance, researchers should not use only disadvantaged people such as poorer people to conduct a potentially harmful study. Researchers must share among all people any advantages identified (Wilson & Shauna, 2017:2; Gaudet & Robert, 2018:123). In this study, ethical concerns were followed in a with the UNISA Research Ethics Policy (1916). Approval to conduct this study was granted by the UNISA College of Education Ethics Review Committee (Ref: 2019/10/1653310802/12/MC)(Appendix A).

4.7.1 Permission to access the field

Right of entry to a research site should be dealt with through appropriate gatekeepers (Punch & Oancea, 2014:65). Access for this research was simultaneously granted by the Ministry of Higher and Tertiary Education, Science and Technological Development (MHTESTD) and the Ministry of Primary and Secondary Education(MPSE). The researcher sought for written permission from the MHTESTD to conduct research at the selected teachers' college (Appendix B). The Ministry is responsible for the administration of all tertiary colleges in the

country and so must be made aware of any research done in the tertiary colleges. The researcher used the letter of permission (Appendix C) to conduct research using student teachers from the selected teachers' college. The researcher sought for written permission from the Ministry of Primary and Secondary Education (MPSE) to go into the schools where primary school student teachers were doing their practicums (Appendix D). The Ministry is responsible for the administration of primary and secondary education schools in Zimbabwe and therefore must be made aware of any research done in schools. The researcher negotiated his way into the schools of interest as an individual. He used the letter of permission from the MPSE (Appendix E) to gain access into the schools. The intention of the visits was clarified to the school heads who in turn helped in arranging for convenient times and places to do lesson observations and carry out individual interviews respectively. The principal of the College endorsed the letters of permission from the MHTESTD and MPSE (Appendix C & E). After the completion of the study the researcher provided the relevant ministries and the teachers college from which the participants were with copies of the findings. The relevant authorities were assured of the secure storage of all names and other identifying information.

4.7.2 Informed consent

Most research guidelines state the need to obtain informed consent. The process of getting informed consent includes information, comprehension and voluntary participation. Informed consent involves providing soon-to-be participants with as much information as possible about the research so that they can make an informed choice on their possible participation (Silverman, 2010:155).

The research participants were given a participant information sheet (Appendix G) and a form of consent to sign (Appendix H). The main purpose of giving the student teachers the participant information sheet was to enlighten them on the purpose of the study, the use the findings will be put to and how the findings will be made secure. The participant information sheet was designed in such a way as to allow potential participants to make an informed choice about their partaking in the study and to put in writing their decision to participate. Potential participants were enlightened on the intention of the study, the processes involved, the dangers involved, and potential benefits of the project, as well as the responsibilities of both the participants and the researcher. Informed consent was acknowledged with the use of a written document approved by the two Ministries through the office of the college principal. The main purpose of the letter of consent was to document the participants'

informed decision to participate in the study. The collection of data was done with the explicit consent of the participants. The participants appended their signatures to the document to indicate their understanding of what their participation entailed and how the findings will be reported.

4.7.3 Privacy, Anonymity and Confidentiality

Privacy and confidentiality must be protected. In any research study the interests of the participants must be protected (Denscombe, 2007:143; Ary *et al.,* 2010:595). There is a wide concurrence among researchers that all participants have a natural right to confidentiality. Researchers must take measures to protect participants from the danger that information they give during a study could fall into the hands of outsiders where it might have detrimental consequences (Ary *et al.,* 2010:597).

Confidentiality and anonymity are two aspects that deal with privacy. Confidentiality means the privacy of individuals is protected by keeping secret and private the information obtained from participants during a study (Ary *et al.,* 2010:597). In this study all information obtained was treated as confidential. Participants were assured that the information they provided was going to be used for the purposes mentioned in the data tools only (Appendix G & H). Anonymity is the practice of shielding the characteristics of the participants (Ary *et al.,* 2010:597). In this study anonymity was achieved by ensuring that no distinctively recognisable information was affixed to the data. Participants were referred to as either Participant A, B to H as a way of shielding the tracing of the data back to the participants providing them.

The researcher provided secure storage for information with regards to the names of the participants and other identifying information. Hard copies of interview transcriptions and observation checklists were securely stored in a lockable cabinet in a lock-up office at the researcher's place of work. The material will be locked up for a prescribed minimum period of five years, for possible future research and educational purposes. Thereafter, it will be shredded. All electronic information is securely stored on a password-protected computer in a lock-up office at the researcher's place of work for the prescribed five years after which it will be deleted. If the data is to be made to accessible to third parties, the researcher will ensure that all identifying information to the data is removed.

4.7.4 Protective Measures for Participants

In all research there must be a consideration of dangers and benefits. The manner and extent of dangers and benefits must be evaluated in an orderly way. Efforts should be made to have an awareness of all kinds of damage that research studies can cause and try to minimise them at all times. Research can cause physical, psychological, legal and economic damage to research participants by affecting an individual's career (Neuman, 2014:147).

The researcher made sure that the research process did not hurt participants in any way. The researcher was sensitive to the interests of the participants and did not pressure the participants to answer questions that they did not want to answer. Before starting the interviews, the researcher first received the participant's permission to record. Potential emotional reactions were dealt with by demonstrating due care, honesty, respect, sympathy and empathy during the research process. Periods of silence during the interview were respected. Participants were told that there were no correct or incorrect answers. Participants were informed of their right not to participate if they so wished (Appendix G & H). If the participants wanted to debrief about the experience, a person was identified to facilitate the process.

4.7.5 Freedom to Withdraw

In research, participants have the right not to take part in the research and to withdraw their participation at any time without any penalty. Research participants should not be coerced into taking part. Consent to take part in the research has to be freely given in order to be valid (Silverman, 2010:155). In this study, the researcher came from a position of power in relation to the participants. Some participants might have felt compelled to participate. Participants were informed about the voluntary nature of their participation. They were told they had the right to decline participation or to withdraw from the study at any time and for any reason if they wished without any penalty. The participants participated in a voluntary way, free from any coercion. Research participants were provided with the opportunity to receive the results of the study. Each interview transcription was given back to the respective participant for his or her perusal, comments and potential editing. Participants were informed that the findings of the study were going to be published as a thesis and as journal articles (Appendix G & H).

4.8 SUMMARY

The chapter outlined the methodological issues pertaining to the conduct of the research discussing the qualitative research design and the methodology using a single-case study design. One teachers' college was used to study the perceptions of eight participants regarding the practical application of constructivism. The purposive, convenience and stratified random sampling strategies were used to select the participants. The population targeted for the study was selected through purposive sampling. The area or region from which part of the population was drawn was selected through convenience sampling. Eight participants for the study were selected through a process of stratified random sampling. Data, collected through class observations and semi-structured interviews, were audio-recorded and transcribed by the researcher. Tesch's method of data analysis was used to analyse the data. The chapter also discussed how the trustworthiness and credibility of the data was ensured and in addition, the ethical considerations that governed the study were presented and discussed. The study resulted in a rich amount of data being collected about the perceptions of primary school student teachers regarding the practical application of constructivism. Chapter Five focuses on data presentation, interpretation and discussion of findings.

CHAPTER FIVE

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

5.1 INTRODUCTION

This chapter focuses on the analysis, interpretation and discussion of the perceptions of eight study participants with regards to the practical application of constructivism in the classroom. The aim of this study was to understand the perceptions of primary school student teachers with regards to the practical application of constructivism in the classroom. The intention of collecting data was to draw conclusions about what should be included in the curriculum to train upcoming cohorts in the practical application of constructivism. The study made use of a qualitative approach to study student teachers' perceptions about the practical application of constructivism. Data were collected through observations of classroom teaching and semi-structured individual interviews. Observations of classroom teaching were intended to record the occurrence of constructivist learning activities in line with the principles mentioned in the literature review and in Appendix J, and not about the frequency of the activity. The main intention was to see if data collected aligned with constructivism. The interviews were meant to capture the perceptions of the participants with regards to the practical application of constructivism in teaching and learning. The findings that were acquired through the in-depth semi-structured interviews are presented and thrashed out in relation to how they corroborate the literature review and contribute to existing literature. The data collected was analysed within the case. This resulted in a rich amount of data which is presented and interpreted to contribute to existing literature. The findings may assist lecturers in understanding the perceptions of student teachers regarding the practical application of constructivism in the classroom and how to adapt the curriculum to include more guidance.

The research questions that led this study were stated in Chapter One and repeated in Chapter Four and is now repeated: *How do primary school student teachers perceive the practical application of constructivism in teaching and learning?*

5.2 INFORMATION ABOUT THE PARTICIPANTS

The data for the study was collected from eight participants sampled from a teachers' college in Zimbabwe. The participants were selected through the processes of purposive sampling, convenience sampling and stratified random sampling. Second year student teachers doing

their practicums in primary schools in the Gweru district made up the case of the study. The participants from the 2019-2021cohort, were of equal gender balance which was meant to give voice to all in the student community. Second year student teachers were targeted for this study because teaching practicums are done in the second year of studies. The practicums give student teachers an opportunity to develop important teaching skills. The contributions of participants from the second-year group of student teachers were likely to be more developed than that of first year or third student teachers. First year student teachers are at college doing their studies in theory of education and third year student teachers are back at college after their teaching practicums and are doing their final studies in theory of education and preparing for their final examinations.

The researcher collected data from the participants using the qualitative approach. The status of the schools ranged from average to good social-economic status with good resources, to schools in deprived areas that were lacking in teaching resources. The sample was small to allow for a detailed study of the perceptions of the participants with regards to their classroom application of constructivist principles.

Participant biographical information is presented in Table 5.1 below:

Table 5.1: Participants' biographical information

Participant	Gender	Age	Main subject	Grade taught	Subject taught
A	Female	34	Art	3	Shona
B	Male	25	Maths	5	Maths
C	Female	26	English	4	English language
D	Male	25	Social studies	5	Shona
E	Female	30	Religious studies	3	English language
F	Male	23	Maths	6	Maths
G	Female	24	English	4	Social studies
H	Male	28	Art	5	Religious studies

5.3 FINDINGS AND DISCUSSION

In this section, the findings of the study are discussed with the findings emerging from the classroom observations which are supported by the findings emerging from the semi-structured individual interviews.

5.3.1 Findings from Classroom Observations

Observations of classroom teaching of the participants were the first source of data. The lesson observations lasted for between 35 and 40 minutes, depending on the time allotted for each lesson period at the particular school. In the observation phase, the observer positioned himself at the back of the classroom where the learners and the participant could be clearly seen, but without interfering with the progress of the lesson. The researcher followed the interactions between the participant and the learners and completed an observation checklist during each lesson(see Appendix J). The findings from lesson observations are recorded in Table 5.2 below:

Table 5.2: Student teachers' classroom application of constructivism

	Constructivist Classroom Activity	Application in the Classroom	
		Participants who applied	Participants who did not apply
1	Decoration of walls with charts and creation of learning corners/areas	All participants	0
2	Arrangement of classroom furniture to facilitate group activities	All participants	0
3	Interactive and learner-centred activities	All participants	0
4	Varied teaching methods	All participants	0
5	Concern with aspects of learners' progress and individual differences and difficulties	A, B, D, E, G,	C, F,H
6	Supporting slow learners to catch up with others	A, B, D, E, F, G	C,H
7	Using games and play activities to promote learning	A, D, E, F	B, C, G, H
8	Regular use of learning aids	A, B, D, E, F, G, H	C
9	Ensuring children's social, mental, physical, spiritual and emotional growth	A, B, E, F, G	D, C, H
10	Whole group and small-group discussions	All participants	0
11	Cooperative/Collaborative learning activities	All participants	0
12	Democratic environment – learners allowed to be active and independent	A,B,C, F, G, H	D, E
13	Discovery learning – classroom experiences that allow learners to predict and manipulate objects	A, B, D, E, F, G	C,H
14	Learners allowed to pose questions	A, F	B,C, D, E, G, H
15	Experimentation – learners allowed to research, investigate, imagine, invent and reason	A,B, D, E, G,	C, F, H
16	Metacognition – learners allowed to think and make use of prior knowledge to reach new understanding	A,B, D, E, F, G	C, H
17	Mutual respect – teacher and learners interact with ease and comfort	A, B, C, D, E, F, G,	H
18	Learners affection for the teacher – learners show affection	A, B, C, F, G, H	D, E
19	Group discussions and teacher support where necessary	A, B, D, E, F, G, H	C
20	Teacher creativity and flexibility in the classroom to incorporate ongoing experiences	A, B, F, G	C, D, E, H
21	Teacher in facilitation role for empowerment of learners	A, B, D, E, F, G, H	C

The analysis of the lesson observations shows that the data align with several design elements of constructivist classrooms. Table 5.2 above shows that student teachers applied learner-centred strategies in their teaching so that their perceptions of the practical application of constructivism are grounded on practical experience. Participants showed that they had learnt different constructivist strategies that are necessary to guide, help and facilitated learning which they applied in the learning environment. Most of the participants showed a good understanding of constructivist learning theory as reflected in their teaching. All participants committed themselves to learner-centred methods of teaching, although in some cases, they reverted to traditional methods. The participants made efforts to actively engage the learners in the learning process. The perception of shifting responsibilities from the teacher to a learner-centred environment was evident. Constructivist classrooms provide experience in and appreciate multiple perspectives. Student teachers in general seemed to take their theoretical learning at college and apply it in practice in the classroom. The student teachers followed the recommended approach by drawing up daily lesson plans which indicated constructivist principles through lesson recapitulation, lesson declaration, group work activities, prior knowledge, media, class discussions, and lesson conclusions. These steps are the focus of practicum assessments. Prior to the observation and during the practicum, mentors had assisted the participants in understanding and completing the required administrative work by showing them the importance of completing documents such as lesson plans, schemes of work, individual progress records, attendance registers thus, demonstrating the link between philosophy, psychology and sociology with teaching.

The participants involved the learners in the lesson and learners were active and participated in construction of knowledge. Participants' classroom management skills were good with the student teachers and learners becoming partners in the learning process. The participants used a variety of teaching methods and integrative activities that involved the learners in active learning. Interactive, group work and individual work were used as strategies to help learners construct knowledge. Learners participated actively and freely in the learning process. Learners were engaged in lessons and this enabled them to come up with alternative solutions to understanding problems. The participants organised collaborative and cooperative learning opportunities for most tasks given. The study participants asked their learners to complete projects where they had to engage collaboratively in activities and evaluate solutions to problems. Group work was given more preference than individual work. In group work,

learners were actively involved in the learning process and gave class reports. Collaborating on various projects provided learners with experiences from multiple perspectives.

Lessons were organised in ways that allowed learners to use their prior knowledge as a foundation for the acquisition of new knowledge. Constructivism proposes that learners should be actively responsible for their own learning and should not be passive readers or listeners. Constructivist learning is active and interactive in nature for all subject matter. Learners should be actively involved in knowledge construction to understand concepts (see Powell & Kalina, 2009:41).It is important that learners take control of their own learning. A constructivist teacher should discover his or her learners' abilities and help them in the learning process. The teacher should scaffold or coach learners to manage their learning needs. Learners at primary school level possibly will not have the ability to direct their own learning; however, it is the duty of the teacher to encourage the learners to take this role (Uden & Beaumont, 2006:14; Hajal, 2019:537).

Varied learning activities were applied to help learners learn new information. The participants in the study kept learners engaged in their own learning through the use of constructivist learning strategies such as inquiry-based learning, discovery learning, discussion and debates, and providing feedback. The strategies helped learners to depend on themselves for constructing knowledge by using higher order thinking skills (Hajal, 2019:538).

The learners were motivated through the provision of adequate resources, posing of appropriate questions at the right time, and linking the questions and resources to learners' prior knowledge. The study participants did not overlook the knowledge and skills that the learners brought into the classroom. All the participants attempted to relate tasks given to learners to real-life problems, this means that the learners were encouraged to connect their real-life experiences with existing and new knowledge and to change their conceptual understanding through problem-solving. The participants facilitated learners in creating the activities that they were to present to their peers and encouraged them to show their work and defend their positions. Learners' points of view were used to deduct their reasoning ability and learners learned to defend their positions on valuable solutions to the lesson inquiry. Learners took responsibility for their own learning. In a constructivist environment, the teacher creates learning activities that encourage learners to show and explain their work. Constructivist knowledge is not acquired externally but is constructed internally with the help

of prior knowledge. In a constructivist learning environment, new learning should be based on old knowledge (Haque, 2018:50; Hajal, 2019:537).

Media in the classrooms was used to encourage multiple modes of representation. Classrooms were in most cases well decorated with wall charts with informative pictures and diagrams. Objects and activities that connected classroom teaching to real life were displayed and used by the participants. A constructivist learning environment is an environment where instruction should be designed in such a way that learners actively participate in sense-making knowledge construction by applying the tools and criteria of constructivist learning theory (Gijbels & Loyens, 2009:501; Hajal, 2019:538). The participants, however, mixed traditional and constructivist approaches in their teaching, because the participants felt uncomfortable when totally applying constructivist principles. They did not want to appear to be losing control of the learning process. Study participants sometimes followed behaviourist teaching strategies when giving rewards to learners. Positive reinforcement strategies such as giving stars for good work and phrases like "Very good! Keep it up" were used quite a lot. In groupwork activities, the study participants did not always use learners' prior knowledge for cooperative learning. The participants sometimes provided learners with answers. Providing learners with answers should occur as a last resort to help learners who fail to achieve the objectives of the lesson. Sometimes the participants gave the learners an exercise with problems to solve after having discussed the knowledge behind that exercise with the learners. The purpose of the exercise was then only to apply what had been taught by the participants and not an opportunity for the learners to construct knowledge on their own.

5.3.2 Findings and Discussions of Individual Interviews

This section focuses on analysing, interpreting and discussing the findings from the individual semi-structured interviews with participants of their perceptions regarding the practical application of constructivism are presented.

A clear understanding of the meaning of perception needs to be clarified. Perception is a noun derived from the word 'perceive'. According to the Merriam-Webster dictionary, perception means to notice, awareness, comprehension or cognition or the way in which something is regarded, understood or interpreted. For the purposes of understanding the data in this study, the second explanation of perception – the way in which something is regarded, understood or interpreted – is applicable. Findings were prepared according to three preconceived categories of 'perceptions', namely the application of traditional approaches, the application

of constructivism and assisting student teacher with the practical application of constructivism. The themes that emerged from the data analysis according to the preconceived categories derived from the research sub-questions are presented in Table 5.3 below.

Table 5.3: Categories and Themes

CATEGORIES	THEMES
1. Application of traditional approaches	1. Continued use of traditional approaches by experienced teachers 2. Perceptions of the practical application of traditional approaches. 3. Challenges of applying traditional approaches.
2. Application of constructivism	1. Perceptions of the application of constructivism 2. Advantages of applying constructivism 3. Challenges of applying constructivism
3. Assisting student teachers with the application of constructivism	1. Constructivism is a highly skilled approach 2. Improving the quality of teacher education programmes 3. Importance of mentor teachers 4. Necessity of adequate resources.

Findings from the empirical study are discussed in accordance with the literature review and the theoretical framework and the findings from the empirical study are used to confirm, refute or extend the knowledge found in the literature. The findings are interpreted in the context of the theoretical framework of constructivism.

5.3.2.1 Category 1: Application of traditional approaches

Sub-question 1asks the question: *What does the practical application of traditional approaches entail in teaching and learning in primary schools?* This question was addressed by question 1 on the interview schedule (See Appendix I). The question aimed at acquiring information about the student teachers' perceptions of the practical application of traditional approaches in teaching and learning in primary schools. Findings from participants' interviews are presented according to three themes that emerged. The first theme was related to the continued use of traditional practices in the schools by established teachers, the second theme was related to participants' perceptions of the practical application of traditional approaches, and the third theme was related to the challenges of the practical application of traditional approaches. The findings are discussed below.

- *Theme 1: The continued use of traditional practices by experienced teachers.*

Participants were asked whether they thought that teachers are still prone or likely to use traditional approaches to teaching and learning. Data from the interviews shows that all participants frequently mentioned that experienced teachers still use traditional approaches to teaching and learning. Participant D, who was being mentored by a Grade 5 teacher said: *Yes. They are still using traditional approaches to teaching and learning.* Participant E, who was being mentored by a Grade 3 teacher, also said: Yes. *They are still prone to using traditional approaches.* Most of the participants agreed that experienced teachers still use traditional approaches to teaching and learning. Participant F, who was being mentored by a Grade 6 teacher, and Participant C, who was being mentored by a Grade 4 teacher, were the only ones who indicated that some of the teachers use traditional approaches as well as other approaches. Participant F said: *I think teachers, some of the teachers, are still prone to using traditional approaches to teaching and learning but most of the teachers are now using other approaches.* Participant C also said: *I think some of the teachers still use traditional approaches whilst others are using the New Approach*. The New Approach is a learner-centred approach which is the subject of reform efforts in Zimbabwe. The approach is basically constructivist.

Participants were asked to identify the kind of traditional approaches which teachers use. Participant D indicated that: *They are still using approaches like the lecture method, the look and say and story-telling.* The 'look and say' or 'whole word' method for reading lessons is a behaviourist method. It can be viewed as being teacher-centred. Learners are made to read words or whole units rather than breaking the word down into individual letters or groups of letters. The 'whole word' method limits the learner to reading books which contain words already memorised. The learner maybe disappointed if he or she comes across a word which has not been taught (www.children-books-and-meaning.com). Participant A, who was being mentored by a Grade 3 mentor, supported the notion of teacher-centred methods still being used in the schools by saying: *The teacher will be telling the story. The teacher tells them, then from the story learners can say what they think or even open up their views.* The story-telling method can be an effective form of teaching. It can be used to arouse interest and provide structure for remembering learning materials, but it is to some extent teacher-centred and can be boring, especially if the teacher does all the story telling (www.psychologicalscience.com). Participant B, who was being mentored by a Grade 5 teacher, whose sentiments were in agreement with the above notion said: *They are teacher-centred which are mostly behaviourist. The teacher stands in front of the class most of the*

times. The teacher is always telling the learners what to do. Teachers still make use of the lecture method where they are the knowledge constructors and conveyors instead of just being facilitators. The participants cited the lecture method, story-telling and 'look and say method' as the traditional methods mostly used by experienced teachers. In all these methods, the teacher dominates the lesson.

Participants were asked to explain why teachers still use traditional approaches to teaching and learning. The theme encompassed various comments surrounding the continued use of traditional approaches by experienced teachers. Participant B noted that: *I think it's because they believe they know better than the learners, so they are able to give the learners the information they require.* Participant G's response also supported the above notion by saying: *I think they are the ones who have the information. They know better than the learners so that they have to give the learners information. They are there just to give the learners information. What the learners don't know is what they just tell them. They are the ones who know better than the learners, so they just have to give the learners information. What they teach they reinforce and the learner is going to understand* (sic). Participant C had a different reason, saying: *I think teachers still using traditional methods are those who have been in the teaching field for long or teachers who have been trained in using such methods. For example, in Grades 1 and 2 classes I entered is where I saw the old approach being applied* (senior teachers are allotted Grade 1 and Grade 2 classes in most schools). Participant A also had a different reason to explain why teachers still use traditional approaches: *Its mainly due to the effect that children come from homes where are taught old approaches and when they come to school, they carry those societal norms...and to grab their attention we should teach from the known to the unknown. So, we should teach them from what they already know to what they don't know.* Participant E also gave a different reason for the continued use of traditional approaches: *I think some of the schools lack adequate resources like textbooks that teachers end up spoon-feeding the learners*.

The theme of the continued use of traditional approaches in teaching and learning by established teachers is confirmed by the literature review. Traditional approaches to teaching and learning are still widely practised in the schools. Teaching and learning remain largely didactic and authoritarian. The continued use of traditional approaches in teaching and learning is a worldwide problem (see du Plessis, 2020:2). Tabulawa (2013:1) notes that sub-Saharan Africa has experienced unprecedented attempts at reforming teacher practices with a

learner-centred pedagogy regarded as an effective antidote to the prevalence of teacher-centred didactic classroom practices. Notwithstanding the efforts, learner-centred pedagogy has done poorly in terms of being institutionalised. Traditional methods, unfortunately, are still widely practised in the schools in most countries of Southern Africa. Mtika and Gates (2010) carried out a study in Malawi that focused on the competence of student teachers to implement learner-centred practices. The study offered no clear evidence that student teachers or qualified teachers developed and used learner-centred education during their classroom practicums in the schools. The findings also showed that progressive pedagogical ideas associated with constructivism that are promoted in teacher education institutions had not resulted in extensive change in classroom practice.

Many teachers still use traditional approaches due to issues such as overcrowded curricula, accountability issues, time issues, nationwide examinations and insufficient pedagogical skills (Soysal & Radmard, 2017:187). According to Tabulawa (2013:1), the failure to adapt to instructional innovation has been attributed to technical problems such as poor teacher training programmes leading to poor teacher quality, lack of resources and selective external examinations. Participants mentioned that teachers still use traditional methods because of the belief that they know better than the learners. Rote and lecture style teaching are still used in the classrooms even with in-service training and policy changes because they have a long history of research and support. Some teachers still use traditional methods because traditional methods give them maximum control over what, when and how learners learn, and this is intuitively attractive to them (Killen, 2019:38). Some teachers feel intimidated by the implementation of constructivism in their classrooms. Teachers who have been in the service for a long period and try to undertake a trial of learner-centred teaching may initially face some instructional challenges. The true implementation of learner-centred teaching may challenge their cognition of learning and pedagogical skills. The challenges may force the teachers to return to their comfort zone in which they employ traditional teaching strategies (Soysal & Radmard, 2017:188).The use of textbooks makes the teacher's task easier, but it does not teach learners to become independent learners. The use of textbooks is teacher-centred, instead of learner-centred. The teacher will be using knowledge-transmission modes of teaching as textbooks transmit inert and fixed knowledge.

- *Theme 2: Perceptions of the practical application of traditional approaches.*

The next theme that emerged in this study was student teachers' perceptions of the practical application of traditional approaches. All participants perceived traditional approaches to be teacher-centred. Participant B said: *They are teacher-centred approaches which are mostly behaviourist. The teacher stands in front of the class and tells the learners most of the information... The teacher controls everything in the room and learners are required to sit and be quiet most of the time*. Three aspects of traditional methods come out in the statement by the participant namely traditional methods are behaviourist, the teacher is an authoritative figure and the learners are passive.

Literature confirms the perceptions of the participants. Participants said that traditional approaches are teacher-centred and there is little active learning by the learners. Traditional approaches use teaching styles which are teacher-centred, where learners become passive listeners. Learners are taught in a manner that is conducive to sitting and listening. In a traditional classroom, the teacher dominates the class and the learners are passive. The teacher transmits information directly to the learners mostly through the lecture method. Class time is structured to reach a clearly defined set of objectives as efficiently as possible. All learners are expected to master a well-defined body of information (Tularam & Machisella, 2018:129). The teacher controls the learning with the emphasis on attaining the correct answer rather than implementing understanding and applying real-world learning activities or self-regulation. The learners are passive onlookers to what is going on and their levels of motivation are low. Some of the learners engage in disruptive activities and other learners may even fall asleep for lack of activity (Loyens, Rikies & Schmidt, 2007).

- *Theme 3: Challenges of the practical application of traditional approaches*

Another theme is the challenges faced when applying traditional approaches in the classroom. Challenges refers to the problems or difficulties associated with the practical application of traditional approaches in teaching and learning. All participants pointed at the challenges in terms of defining the approach, teaching methods and strategies as highlighted in the literature.

Participant F posited that: *Traditional approaches are not really interesting to use. Sometimes when teaching you find that you finish doing all the work you had planned for before the lesson comes to an end. You find that you have nothing to occupy the learners for the remaining minutes and learners start doing all sorts of bad things. They start shouting at*

each other, throwing objects at each other and even fighting. The rest of the time you find yourself shouting "quiet", "quiet please", but they don't listen to you. Participant H agreed with the above response: *The teacher does most of the work, but this is not an interesting way to teach. Learners quickly lose interest in what you are saying. They start to talk to each other when you are busy explaining something. Others start dozing or fighting each other.* The use of traditional approaches often results in disciplinary problems in the classroom.

Literature confirmed the above discussion. Traditional approaches are more suited for helping learners acquire declarative knowledge and procedural knowledge or skills. Teacher-centred learning aims at helping learners accomplish pre-specified goals for knowledge and for learning within a structured environment. Traditional approaches may not provide learners with valuable learning skills because learners, in a traditional class, are required to sit and listen. Traditional methods do not lead to deeper learning and greater understanding, they do not bring about transfer of learning and so do not prepare learners for life in the twenty-first century. Traditional approaches do not lead to independent and lifelong learning (Arends, 2012:260;Tularam & Machisella, 2018:129).

5.3.2.2 Category 2: Application of constructivism

Sub-question 2 asked: *What does the practical application of constructivism entail in teaching and learning in primary schools?* The research question was addressed by questions 2, 3 and 4 on the interview schedule (see Appendix I). Three themes emerged from the category of applying constructivism and are perceptions of the application of constructivism, advantages of applying constructivism and challenges of applying constructivism.

- *Theme 1: Perceptions of the practical application of constructivism*

Participants were asked about their perceptions of the practical application of constructivism. The participants confirmed the theme through various comments that encompassed their perceptions. Participants had a positive perception of constructivism and its practical application in the classroom. Participant D perceived the practical application of constructivism as beneficial by saying: *My opinions are that the practical application of constructivism in teaching and learning is so beneficial in the sense that it follows learners' needs and interests. Therefore, teaching and learning follows the interests and needs of learners. Learning will be enjoyable and as a result, the learners will participate freely as they will be enjoying learning. As we are following their needs, their interests, we are not*

forcing them but what we are doing, we are following their needs, what they want. So, learning will be enjoyable. In addition, Participant F said: *I think all teachers must use the practical application of constructivism in teaching and learning so that learners may master better the concepts being taught.*

Participants confirmed what literature indicates about the practical application of constructivism. Participants indicated that constructivism is different from the traditional approaches. Constructivism is a current and popular approach for designing learning environments. The participants confirmed the advantages of applying learner-centred learning strategies. Participant E said: *I think it is the best way to teach and learn because it caters for individual differences like the higher ability learners can do some of the tasks on their own whilst the teacher as a facilitator will also be helping low ability learners.* The practical application of constructivism creates more opportunities to differentiate learning. Differentiated learning includes reaching learners through a variety of methods. Differentiated learning is the tailoring of instruction to meet individual needs. The teacher factors in learners' individual learning styles and levels of readiness first before designing a lesson. The teacher adjusts either the content being discussed, the process used to learn or the product expected from learners to ensure that learners at different starting points can receive the instruction they need to grow and succeed (www.resilienteducator.com). Participant C was more detailed: *I think constructivism yields positive results. Its applicable in a classroom situation as opposed to the teacher-centred approach. Learners will be involved as it is a hands-on approach. Learners will gain understanding as they go on because it is connected to their way of life. It's not like at school they learn something different from that which they learn at home, but it will be the same. As a result, they will understand what they are learning.* Literature confirms participants' responses. The participants mentioned that constructivism enhances the ability of the learners to work hard, understand deeply and retain more information. Constructivist learning theory views learners as being actively involved in their own knowledge construction and retaining ownership of learnt material. What learners learn is based on their interaction with their environment. Learning in a constructivist environment takes place because the learners interpret and make sense of their surroundings and not because of the transference of knowledge from the teacher to the learner through the text or a personal knowledge base. The teacher's role in this context is to facilitate activities that will guide the learner into developing meaningful concepts (Anagun, 2018:827).

Participants were unanimous with regard to constructivism as the best way to teach. They were probed to explain why they saw constructivism as the best way to teach. Participant B said: *I can say it's very good because the learners will learn on their own. Learners must learn by themselves then the teacher acts as a facilitator.* Participant D said: *I believe that constructivism is the best way to teach and learn because mostly it is learner-centred. The teaching and learning is not centred on the teacher but it is rather centred on the learners themselves. Therefore, constructivism is the best way to teach and learn.* Participant G said: *I think constructivism is a good method of teaching learners because the learners just need to discover something on their own. That is the best way of learning.* Participants A, C, E and G all agreed with the above narratives.

Literature confirms participants' responses. The participants indicated that constructivism shifts the responsibility of learning from the teacher to the learner, thereby making the learning process learner-centred. Participants commented that learner-centredness leads to deeper learner engagement. The participants see learners' depth of knowledge or engagement increasing as learners reflect and synthesise what they have learned. Participant A said of constructivism: *It's good because, one, it grabs learners' attention, and secondly, it leads to them doing, it leads to memory retention, they remember what they have done than what they see or hear.* The participant perceives that the depth of the learners' knowledge or engagement increases as learners reflect and synthesise what they have learned.

Participants were asked to explain what constructivism entails. Participants expressed their responses in many ways. Participant H said: *It involves groupwork, discussions done by learners whereby the teacher will only be working as a facilitator*. Participant C said: *I think learners will be doing most of the activities. The teacher just demonstrates at the beginning of the lesson, then the teacher leaves the learners to do most of the activities such as experimentation. Learners will be doing the actual experimentation rather than being told or shown what to do by the teacher. It is a hands-on approach where the learners do the actual experimentation with objects of their choice. Learners get first-hand information instead of being told by the teacher or observing the teacher doing the experiment*. Participant E said: *It can be used through experiments, through games, through role play whereby learners take part and when learners take part, it becomes easy for them not to forget the concepts and through discovery learning.* Participant D said: *Yes, in the sense that it promotes learner-centred learning approaches, for example, free-play. Learners will be able to manipulate*

whatever resources in the teaching and learning situations. Learners will be able to explore and discover facts for themselves and due to this constructivism, teachers can easily foretell the talent in each child and then they have the chance to mould the learners according to their talents. The participants cited several factors that illustrate the nature of constructivist learning, such as high motivation, active participation by the learners, greater understanding, authentic learning experiences, individualised learning, independent learning, the facilitatory role of the teacher, and interactive learning. A constructivist learning situation is characterised by the application of authentic, experiential, discovery learning and discussion. Participants identified several constructivist learning strategies such as groupwork, discussions, experimentation, games, role-play, discovery learning and free-play.

Literature confirms empirical findings about the practical application of constructivism. The constructivist perspective explains the way in which knowledge is conceived and organised. The constructivist perspective does not perceive learning as a stimulus-response exercise, or that meaning can merely be passed on to learners through symbols and transmission. Learners do not assimilate exact copies of the teacher's understanding for their own use. In a constructivist classroom, knowledge is created. Learners construct their own understanding and knowledge of the world through experiencing the world and reflecting on the experiences (Harasim, 2017:62). An individual actively constructs his or her own knowledge because of innate capacities interacting with his or her experiences (www.simplypsychology.org/constructivism.html). Constructivism describes knowledge not as truths to be transmitted or discovered, but as emergent, developmental, non-objective, viable knowledge constructed by humans engaged in learning-making in cultural and social communities of discourse (Beyhan & Koksul, 2013:172).

The basic premise of constructivism is that knowledge is constructed, and understanding is expanded through active construction and reconstruction of mental frameworks. Constructivism, as learning theory suggests, is an approach to instruction that gives learners the opportunity for concrete, contextually meaningful experience through which they search for patterns, raise questions and model, interpret, and defend their strategies and ideas. A constructivist classroom should act like a miniature society where a community of learners are engaged in an activity, discourse, interpretation, justification and reflection. The goals of constructivist instruction are autonomy, mutual reciprocity of social relations, and empowerment (Lynch, 2012:167). The constructivist teacher should create learning

environments that entail learners assuming more responsibility and being more active in the learning process. The environments should be organised in ways that help learners to get involved in more interaction with their environments and thus have more rich learning experiences. The environments give learners the chance to test the truth of previously constructed knowledge, to correct mistakes and to replace old ideas with new ones. Constructivist learning environments are places where learning is possible with learners' intellectual activities and where research is carried out and problems are solved. The environments lead to complexity. The environments should also include issues such as social agreement, attaching importance to multiple views, different learning types, assuming responsibility during learning and learners' awareness of themselves in constructing knowledge (Beyhan & Koksul, 2013: 172; Anagun, 2018:827).

The constructivist learning theory stresses that learners should reflect more, understand, take the responsibility for their own learning and control their own behaviours. In a constructivist learning situation, knowledge should be created in the mind of the learner. Learning is not a passive process of simply receiving information but involves deliberate progressive construction and deepening of meaning. Learners should actively and continuously construct their own meanings and understandings of reality and the world in which they live. Understanding involves the development of valid connections between new and existing knowledge and experiences. Constructivism assumes knowledge to be autonomous of the external world and acquired by passive absorption or by simple transfer from one individual to another through interaction (Lynch, 2012:167; Killen, 2019:13).

Free play is unstructured, voluntary, child-initiated activity that allows children to develop their imaginations while exploring and experiencing the world around them. It is spontaneous play that comes naturally from children's curiosity, love of discovery and enthusiasm (www.pgpedia.com). Free play helps children to create experiences that will help to understand how society works and how to interact with other people.

Participants confirmed the pedagogical shift of learning from the teacher to the learner. The shift leads the teacher from being a lecturer to a facilitator of learning with a large repertoire of effective tools to share with learners no matter what curriculum is being used (Winterhalder, 2017:115). The teacher becomes a participant and co-learner in lessons. The teacher corrects misconceptions but does not tell the learners what they need to know. An excerpt from Participant D summarises the perceptions of the student teachers: *The teacher*

becomes more of a facilitator of learning. The participant regards the teacher as a facilitator and learners taking on ownership of their ideas. A facilitator is a consensus builder. A facilitator helps by providing structure to a process enabling cooperative decision making. A facilitator does not lead, but rather guides. A facilitator does not offer solutions or recommend decisions but rather helps the group discover solutions (Gould, 2012). The traditional hierarchy of the teacher as the autocratic knower, and learner as the unknowing, controlled subject studying, practising what the teacher knows, dissipates. In constructivism, teachers are managers and facilitators that help learners construct knowledge and explore meaning rather than being knowledge providers.

Because of the constructivist belief that knowledge originates from within the individual, a constructivist teacher should always consider ways to facilitate the learning process. The constructivist teacher facilitates learning by posing questions to learners that stimulate self-construction and interaction. The process of facilitation involves active listening and repetition of what the learner says to "hammer in" meaning and understanding. A constructivist teacher seeks understanding through a balance of inquiry, paraphrasing, and articulation, so that the learner can seek out cohesion and meaning in various ideas (Lynch, 2012:168).

- *Theme 2: Advantages of applying constructivism.*

The next theme to emerge from the data was the advantages of applying constructivism. Participants unanimously indicated that constructivism leads to deeper learning and greater understanding. Participant B said: *I can say learners learn better by themselves and they won't easily forget what they discover.* Constructivist learning theory offers many advantages to the teacher and to the learners. Learners learn facts in a way that is useful in actual practice or work situations (Uden & Beaumont, 2006:26). Learners develop the ability to learn. Learners learn to think and solve problems like professionals in their field and to link theory to practice. Traditional methods are not preparing learners for the job market; for example, learners cannot perform decision-making and problem-solving tasks associated with their profession. The constructivist learning process includes learning experiences and activities which make the learner enjoy learning. Participant H said: *It enables learners to think and learn on their own. It also enables learners to learn from each other. The teachers can also get a chance to learn from the learners.* Participant D was in agreement: *I think constructivism is important because it gives learners an opportunity to actively participate*

during teaching and learning. Participant G agreed with the above responses which are all in agreement with literature. Learning in constructivism is a meaning-making process where meaning is created by the learner. Learners create knowledge individually and reorganise it, therefore learning means appropriating knowledge rather than adopting it passively. Constructivism concentrates on thinking, negotiations and understanding of knowledge rather than on the rote memorisation of fixed and innate knowledge. Learners are involved in the learning process rather than being passive recipients of knowledge. The learner becomes an active creator of knowledge who internalises it. Learners are not considered empty vessels to be filled but rather active individuals that seek and create meaning (Beyhan & Koksul, 2013:171). Participant A also mentioned that: *Its important because it makes the learners feel being accommodated. They have a sense of ownership and once they have ownership, they can do whatever they think and it's easier to identify learners' talents and nature them. It also accommodates even learners with disabilities.* The statement confirms that constructivism leads to long-term retention of knowledge and contributes to the formation of higher-order cognitive skills. This comes about because of how individuals make meaning out of knowledge rather than adopting it. Constructivism creates an environment in which learners can interact and have rich learning experiences. Learning activities are based on learners' problem solving, critical thinking and creativity processes. Learners actively get involved in meaning-making processes. In such environments, learners are meaning hunters and problem solvers. Learners learn more and enjoy learning. Basic knowledge and skills are considered and such issues as reflection, understanding, questioning and application of knowledge are stressed (Beysan & Koksul, 2013:172). The main purpose of the learning process is to help learners seek their own meaning-making decisions, work in cooperation and learn by using their higher-order thinking skills. Rich experiences activate the learning process and positively affect the learning levels of learners.

Participants confirmed that constructivist learning is flexible and transferable. Participant A said: *Its important because it makes learners feel being accommodated. They have a sense of ownership and once they have a sense of ownership, they can do whatever they think and it's easier to identify learners' talents and then nurture them. It also accommodates learners with disabilities.* This response was supported by Participant E who said: *I think if well fostered, constructivism plays a pivotal role because learners will learn independently. Also, if the learners are groomed at an early age, it helps them when they become adults or when they pursue higher education.* Learners are involved in the creation of knowledge. Learners are

given ownership of what they have learned since learning is flexible and is based on learners' creative questions, discussions and explorations. Assessment in constructivism includes learner's initiatives and their own investments in creative representations. Constructivist learning theory encourages the engagement of the creative instincts which facilitate learners' abilities to express their own knowledge through a variety of ways. This was confirmed by Participant G who said: *Constructivism can equip the learners with creative skills to do things on their own in life. When learners become creative, they can do something that has not been done in Zimbabwe.* Constructivist learning stimulates, encourages and engages learners by grounding learning in authentic, real world contexts and providing real life situations to face. Learners are provided with the opportunity to retain and transfer their own learning to their real life. Learners in a constructivist classroom learn to question different things and are given the opportunity to apply their natural curiosity. This was pointed out by Participant F who said: *I think constructivism is the best way to teach and learn because since the learners are to gain knowledge, they must be involved so they will be critical thinkers in teaching and learning.* Constructivist learning promotes and provides social and communication skills by creating a classroom environment which is more democratic, joyful and collaborative. The classroom environment emphasises discussion and exchange of ideas. Learners learn how to articulate and advocate their ideas clearly as well as to collaborate in completing learning tasks and conditions effectively by showing their understanding in group projects. Learners learn to negotiate with others and to make evaluations of their contributions in a socially acceptable manner. This is necessary for success in the real world since learners will always be exposed to a variety of real-life experiences in which they will have to cooperate, negotiate and navigate among the ideas of others This was confirmed by Participant D who said: *I will actually explain its advantages. For example, basing on the idea of inter- and intra- psychological, constructivism gives learners an opportunity to meet and interact either as self or as a group. For example, they can be having peer tutoring – learning from each other, learning from one level to another, while they interact either inter- or intra- psychological.* This was supported by Participant H who said: *It enables learners to learn on their own. It also enables learners to learn from each other. The teachers can also get a chance to learn from the learners.*

The theme on the perception of the practical application of constructivism raised issues that receive support from findings in current literature. The effects of applying constructivist strategies in the class, in relation to learner commitment, interaction, and teamwork have

been documented by many researchers. For instance, Reychav and Wu (2015) carried out a study on mobile collaborative learning. The study emphasised the role of individual learning in groups through text and video content delivery on tablets. The findings of the study suggest that collaborative efforts in learning enhance learning satisfaction. Collaborative learning has a great impact on understanding. It improves learner engagement, interaction and communication. Haber-Curran and Tillapaugh (2015) carried out a phenomenological study of learners in a learner-centred environment. The study emphasised the importance of learner pedagogy and how the shift from the traditional classroom structure presents new challenges. The findings of the study revealed that the pedagogical approach of learner-centred learning versus traditional methods proved to be effective for learner engagement in learning. Learner-centred learning produces learners who are more independent and who take charge of their learning (Winterhalder, 2017:170).

- *Theme 3: Challenges of applying constructivism.*

The third theme that emerged from analysis of the interview data relates to the challenges of applying constructivism in the classroom. A challenge can be a new or difficult task that tests somebody's ability and skill. Constructivism is a more recent learning theory and it comes with challenges of its own. Participants' responses confirmed three specific challenges to the practical application of constructivism, namely overcrowding in the classrooms, time constraints and shortages of teaching and learning resources. These challenges made it difficult for participants to effectively apply constructivism in teaching and learning. The challenge of shortage of resources in the schools was frequently mentioned by the participants. For the practical application of constructivism to be effective learners need to make use of material that appeals to their five senses. Participant B said: *I can say it needs more resources since the children have to use media in their learning. It also needs more time in training the teacher. The teacher will do a lot of work during the lesson because the learners will do their work in groups, then the teacher will just be supervising.* Constructivism needs resources in the form of conventional textbooks, the library and technological gadgets. Technology gives the opportunity to involve learners of many levels. This was succinctly put across by Participant A who explained how experienced teachers could be convinced to use constructivism: *One of the main reasons is inadequacy of media, especially in the New Approach of child-centred education. Each child should learn by doing and that means if we are to teach learners a certain concept, they need to touch, they need to*

see, they need to sense. All things need to be used but considering the economy of Zimbabwe, it's very difficult to find those resources. And you can even come to ICT tools, not all teachers have the knowledge to use them, and this equipment is not available. Erratic power supplies also contribute. The participant brings out the point that resources that appeal to all the senses of the learners need to be provided if the application of constructivism is to be effective.

Participants mentioned overcrowding in the classrooms as a challenge to the practical application of constructivism. Participant A emphasised the problem of overcrowding in the classrooms: *Its very expensive (that is, the practical application of constructivism), considering the inflation rate in Zimbabwe and considering what is on the ground in Zimbabwe. You can even consider the teacher-pupil ratio. It should be 1:20 according to SI 106 (Statutory Instrument 106) but on the actual ground its 1:70.* The following excerpt from Participant C also shows how study participants perceived the effects of overcrowding in the classrooms: *Then the other issue is about the environment which may not be permitting. The teacher-learner ratio may be too high which makes it difficult to implement constructivist principles.* This aspect was also noted during classroom observations. Classes tended to be very large in most cases. It is evident from the responses of the participants and the classroom observations that the study participants struggled to teach effectively in overcrowded classrooms. Large classes result in too much noise and discipline problems. The learner numbers usually determine the choice of teaching strategies of which constructivism was not one. In a study by Imtiaz (2014:251), the participants indicated that they were intimated by large class numbers and they were consequently unable to deliver satisfactory academic results.

Another challenge faced by the participants was that of time constraints. Participants E and Participant C indicated that the time available for practically applying constructivism during a lesson was limited. Participant E, when asked about what should be done to help student primary school student teachers to apply constructivism, said: *I think the provision of adequate resources and more time from the school administration.* Participant C also noted that: *Constructivism may be time consuming on one side since every learner must discover. Of course, they are discovering the same information but it may take time for slow learners to understand or to gather information on that they are supposed to learn.* The participants are referring to the quality and quantity of time learners are engaged in classroom activities.

From the classroom observations, it appears that the participants needed more time to engage learners in both research and classroom discussions, and in creating projects. In a constructivist learning environment, learners must not be hurried to come up with answers. Individual differences are an important consideration in constructivism. Learners must be allowed to progress at their own pace (Reigluth, Beatty & Myers, 2017).

5.3.2.3 Category 3: Assisting student teachers with the application of constructivism

Sub-question 5 asked: *How can primary school student teachers be assisted to apply constructivist principles in the classroom?* The research question was addressed by interviews question 5 on the interview protocol (see Appendix I). The question asks for information on what should be done to enhance the appreciation of constructivism in teacher education programmes. Four themes emerged during data analysis and are related to the level of skills needed by teachers to be effective constructivist teachers, improving the quality of teacher education programmes, acknowledging the important role of mentor teachers and the provision of adequate resources for the effective classroom application of constructivism.

- *Theme 1: Constructivism is a highly skilled approach.*

The first theme of the category of helping student teachers with the practical application of constructivism was an acknowledgement of a high level of skills needed to be an effective constructivist teacher. Participants alluded to the high level of skills inherent in constructivist teaching. Participant C indicated: *I think it needs the teacher to be on his or her toes and be up-to-date with what is trending in education and also to be resourceful. Some might say it is expensive, but I do not see it being so because a teacher can improvise. The teacher is a facilitator*. Participant D was more to the point: *It means less freedom to the teacher and more freedom to the learners.* Participant B added: *I can say it needs more resources since the children have to use media in their learning. It also needs more time in training the teacher. The teacher will not do a lot of work during the lesson because the learners will be doing their work in groups, then the teacher will just be supervising.* The teacher's main role is to facilitate learners' understanding rather than simply pass on the information. Facilitation places a heavy burden on the teacher. The teacher should take learners from a state of not understanding to a state of deep understanding and this requires teachers to have higher levels of skills. The interaction between the teacher's subject matter knowledge and the teaching skills becomes vital. Knowledgeable teachers who lack the necessary skills will not be effective and neither will be skilful teachers who lack the necessary content.

The theme confirms the literature on constructivist teaching. The effectiveness of any learning venture depends on the skills of the teacher. In any learning situation, the teacher needs to be skilled to handle the learning process, but this is more significant when using constructivist principles in the classroom. Constructivist instruction designs differ considerably from the traditional methods. Constructivist teaching is generic but requires the teacher to have higher levels of skills. The teacher cannot take a one-size fits all approach in a learner-centred approach. Learner-centred teaching approaches require complex thinking on the part of the learners. The constructivist teacher must have a large repertoire of effective methods to share with learners, no matter which curriculum is being implemented. The goals of constructivist learning cannot be achieved through teaching that emphasises content transfer. The teacher should consider how best to help individual learners to process and make sense of what they are experiencing. The teacher should help learners to self-report on their learning and to ask questions about things they do not understand. The constructivist teacher also must develop learners' general capabilities and their understanding of broad-based curriculum issues. Constructivist teaching also aims at developing lifelong learning skills and active citizenship in learners. A constructivist teacher is also explicitly required to teach learners how to learn critically, to solve complex problems and to become technologically literate (Killen, 2019:4).

Constructivist notions about good teaching are based on understanding how individuals learn. The instruction offered by the constructivist teacher supports the cognitive processes of learning. The instruction aims to change the minds of the learners and not just presenting the context in the form of sequence in which it is set in the syllabus. The cognitive processing is enhanced by instructional strategies that allow information to be presented through multiple learning pathways such as oral explanations supported by visual examples.

Constructivist views of effective teaching are hinged on acknowledging that significant learning is based on understanding. The ability to transform information into forms that make it easier for learners to use new information is at the heart of constructivist teaching. The teacher must spend considerable amounts of time transforming raw content into forms that are comprehensible to learners. The teacher must help learners to make sense of new information, integrate new information with the learners' existing idea, be aware of learners' thinking and learning processes and apply their new understanding in meaningful and coherent ways. The teacher must deliberately help learners construct their own understanding

rather than simply tell them things that they are expected to summarise. The teacher has to identify the important concepts and principles that learners need to understand and organise them into a coherent structure. Effective ways of explaining the key ideas and their relationships have to be devised. Themes and issues that will help learners relate the new information to their existing knowledge must also be identified. The teacher must also be adept at recognising the difficulties that learners might have in understanding the content and devise ways of minimising the difficulties. Constructivism emphasises that individuals learn best through personally meaningful experiences that enable them to connect new knowledge to what they already believe or understand (Killen, 2019:3).

- *Theme 2: Improving the quality of teacher education programmes*

Another theme that came up and which relates to sub-question 3,is the need to improve the quality of teacher education programmes. The theme combines references to the participants' views of the future role of constructivism and the need to improve the quality of teacher education programmes. The responses of the participants were mixed. Some participants said they received adequate training whilst others said more needs to be done. Most study participants mentioned the need to improve the quality of teacher education programmes.

The theme confirms literature. The constructivist learning theory is currently a popular theory in education with efforts being made into implementing it into many educational systems. Constructivism is regarded as a teaching approach that can help learners to prepare for living, working, and learning in a future workplace where the skills employers require are constantly changing (Jukes & Schaaf, 2019:26). Learners need to develop an understanding of the subject matter as well as learning skills. The acquisition of learning skills is critical in today's environment where information is easily accessible and exponentially growing (Weimer, 2013:2). This means that if student teachers are to implement constructivism in their teaching, they need to be fully equipped during their teacher education programme.

Participants comments on the quality instruction they receive at college were also mixed: Participant C commented: *At college we get enough training. For example, when we do micro-teaching, we get enough exposure and we reflect on our performance so that by the time we go for teaching practice, we would be fully equipped. Plus, the other issue is that we are taught to improvise whilst at college, to make media, charts and materials which are mostly learner-centred such that when we go out in the field, we would be having a clear*

picture of how to do some things. Participant B agreed: *As far as I am concerned, yes, we get enough training at college but when they(sic) go on teaching practice, the mentors may direct them to traditional teaching. There is some sort of conflict between what is taught at college and what prevails in the schools.* Participant E, Participant F, Participant H and Participant G agreed with the above notion. Participant D, however, did not agree: *I think there is not enough training, basing on the period we take whilst in college before we are deployed for teaching practice. We are deployed for teaching practice after three terms at college, and by that time the teacher trainees are deployed, some of them will not be fully equipped on what they should do to use the constructivism approach practically in the classroom. Worse still when they go for teaching practice, most of the senior teachers who will be their mentors – most of them - they are still prone to using traditional approaches due to the fact that they want to manage time, most of them use traditional approaches instead of constructivism so it will be so difficult for the teacher trainees to get enough knowledge about the constructivist approach.* Participant A also expressed similar sentiments.

The responses show that student teachers in general have some mental schemes in their minds that are related to constructivism in that they have been introduced to the theory of constructivism. Participants indicated that they did not get enough time to master the practical application of constructivist practices in the classroom when at college. Most participants said that student teachers need more time to practise constructivism at college before they go into the schools. The student teachers are relatively well versed with the theoretical knowledge of what constructivism is all about, but they lack the skills. Constructivism is taught in the educational psychology course as a discrete theory, but constructivism is not infused in the syllabus in a way that helps student teachers to get a feel of what constructivism is and how it should be applied in practice. Student teachers are well versed in the theory of constructivism, but they face challenges in putting theory into practice. Their training programme does not offer enough experiences in the practical application of constructivism. Thus, when such student teachers are placed under the tutelage of teacher mentors whose knowledge of constructivism is limited, they find it difficult to design lessons which apply the theory of constructivism and showcase their knowledge in novel ways.

Participants were asked about what should be done to enhance the practical application of constructivism in teacher education programmes. Participants pointed to the need to improve the quality of teacher education programmes. Participant A said: *Maybe they should be*

helped with adequate knowledge and skills on how to accommodate this approach in teaching and learning. Participant G also commented: *In their first year, when they are doing micro-teaching, that is the best time to make sure that they use the constructivist approach for teaching. When they go to the schools, they then use constructivism to teach. Lecturers must make sure that when they go out for teaching practice supervision, student teachers are using constructivist principles.* Participant D also added: *I think they should be encouraged to use the New Approach during their micro-teaching, during their peer teaching and also when they are deployed for teaching practice. There is need to help them during assessment. They need to be encouraged to use the constructivist approach.* It seems from the above responses that student teachers feel that they are not getting enough experience on constructivist teaching at college prior to going into the schools.

The participants in their responses point to the need to improve the quality of constructivist teaching programmes in teacher education. There are several problems faced by teachers while using constructivist approaches in schools, and the problems are basically due to the poor training of teachers. The practical application of constructivism is better when teachers understand how constructivism should be applied. Teachers who have a thorough knowledge of the underlying theory and methods of constructivism are more effective (www.exploratarium.edu/education/ifif/constructivist-learning). Experienced teachers are blamed for their apparent inability to apply constructivist principles in the classroom because of their lack of knowledge and skills in constructivist teaching. Most of the teachers in the schools appear not to have the content knowledge and skills on how to apply constructivist principles. Most of them were not trained in applying constructivist practices at the time of implementation of constructivism.

- *Theme 3: Importance of mentor teachers*

Another theme which emerged was related to the importance of mentor teachers in the implementation of constructivism. Participants frequently mentioned that they did not receive the support they needed from their mentors in implementing constructivism which points to the importance they attached to the role played by mentor teachers. Participant F pointed out: *I think mentors must act as role models by teaching using constructivism or child-centred methods so that the student teachers would imitate what is being done by the mentors.* Participant C also commented: *For student teachers, I think we get full information but when we go for teaching practice, we come across mentors who do not appreciate the idea that*

learners must be doing most of the activities. That is where the challenge comes in. Then the other issue is about the environment which may not be permitting. The teacher-learner ratio may be too high which makes it difficult to implement constructivist principles. Participant E also pointed out: *Yes. Student teachers are taught how to apply constructivism, but the challenge is with the schools. The mentors still have or are still attached to the traditional methods of teaching. They do not want to adapt to change.* The responses from the participants point to the important role played by mentors in implementing constructivism. Quality mentoring can greatly enhance a novice's chances of success. Mentoring is a more structured, sustained relationship for supporting professional learners at the early stage of their career, through a career transition or when facing a challenge. Mentoring is important because of the knowledge and skills learners can learn from the mentors (www.dera.ice.ac.uk>mite).

Participants were asked about what needs to be done to enhance the practical application of constructivism. They pointed to the importance of involving experienced teachers in the reform movement of constructivism so that they become well versed with the knowledge and skills of constructivism. The responses from the participants show the lack of congruence between the teaching practices of the student teachers and those of the experienced teachers in the field. The excerpt from participant B sums up the nature of relations that exists between student teachers and teacher mentors: *As far as I am concerned yes, they get enough training at college but when they go on teaching practice, the mentors may direct them to traditional teaching. There is some sort of conflict between what is taught at college and what prevails in the schools.* It is evident from the responses that the implementation and operation of mentoring roles in the schools is not strongly supportive of the implementation of constructivism. Instead of nurturing constructivist teaching skills in the participants, some of the mentors imposed their ideas on the participants. Some mentors are not skilled in the practical application of constructivism, so they were unable to offer guidance to the participants. Some of the experienced teachers were not trained on how to apply constructivism in teaching and learning. Experienced teachers went through a teacher education process which did not emphasise constructivism and are not prepared to learn anything from the novices from college. When they are told about approaches to implement constructivism, it contradicts with their existing schemes. It is difficult for such teachers to accept constructivism as a useful theory for learning and so are not supportive of the implementation of constructivism. For example, an excerpt from participant C shows that

some of the mentors are not prepared to change: *For student teachers, I think at college we get enough training but when we go for teaching practice, we come across mentors who do not appreciate the idea that learners must be doing most of the activities. That is where the challenge comes in.* Still further, some mentors treat the participants as apprentices who have to learn from the mentor without question. Some of the teachers were reluctant to let student teacher apply constructivist practices in their classes. Participant G emphasises this trend: *To a larger extent yes. It depends with the mentor. Some mentors give them time to do it. Some mentors decline, saying they know better than the student teacher, so they teach those subjects which are cheaper and in those subjects the teacher uses traditional methods. Lecturers also explain in the classroom.* The biggest challenge was that most of the participants knew more about the skills and knowledge for practically applying constructivism more than the mentors. In education, mentoring is one of the most effective ways of developing the quality of student teachers during teacher preparation programmes. Research related to teacher education shows that student teaching practicums in the schools serve as the most significant factor in shaping student teachers' experience in training to be a teacher (Mpofu & Chimhenga, 2016:1). In teacher preparation programmes, the mentoring programme can play a significant role in shaping the values, beliefs and teaching skills of student teachers. The mentor role is critical in guiding student teachers to further develop their planning, instruction and content knowledge. The programme can have a huge influence on their behaviour and the choices they can make later in their career. Mentors help to orient student teachers to their school community and to teaching in general. The mentor teacher has greater perspective. The mentor gives helpful advice to novice teachers to improve teaching methods and practices (www.incompassinged.com).

When the participants were asked about their thoughts on what should be done to enhance the practical application of constructivism in the classroom, they pointed to the need to include experienced teachers in the reform movement through workshops. Participants indicated the following when asked about how mentor teacher could be assisted: Participant C said: *I think they must vary the mentors they invite for workshops. They must not invite the same mentors to come for training, but all teachers must be given a chance because most teachers are still using the old approach. The other thing is that the Heads of schools must be particular about the application of constructivist principles when they supervise not only student teachers but for mentor teachers as well. Plus, they can also organise days when all teachers at the school*

can observe an experienced teacher teaching using constructivist principles so that all teachers can speak with the same language on constructivism.

The importance of mentor teachers in the reform effort also came up when the participants were asked about what should be done to make constructivism attractive to practicing teachers. Participant D explained how constructivist principles could be made more attractive to existing teachers in school: *I will actually explain its advantages. For example, basing on the idea of inter- and intra-psychological, constructivism gives learners an opportunity to meet and interact either as self or as a group. For example, they can be having peer tutoring – learning from each other, learning from one level to another, while they interact either inter- or intra-psychological.* Participant C corroborated with the following idea: *I think maybe I can make use of ICT, like projectors, so that they appreciate the use of the New Approach ..., demonstrations ..., practically and not only explaining but learning out what will be going on in a classroom situation where constructivism is being applied so that they get to appreciate because just explaining by word of mouth will not yield positive results but if they do and observe.* The participants wished mentor teachers would be more understanding, good role models and treat them as teacher candidates and not as students. They also wished mentors would give constructive feedback on their performance.

The mentor teacher is responsible for the quality of experience the student teacher receives. Mentoring involves guidance and suggestion, as well as the development of autonomous skills, judgements, personal and professional, expertise, trust and the development of self-confidence over time. A good mentor is willing to share skills, knowledge and expertise. He or she is willing to teach what he or she knows and accepts the mentees where they are currently in their professional development. Good mentors should remember what it was like just starting out in the field (www.flashpoint.columbiacollege.edu).

- *Theme 4: Necessity for adequate resources*

The fourth theme relates to the need for adequate resources for constructivism to be effective. Most participants indicated that constructivism is costly to apply and that many schools do not have adequate resources. Participants pointed to the inadequacy of resources in most schools. Participant E commented: *I think some of the schools lack adequate resources like textbooks that teachers end up spoon-feeding the learners.* Participant B also added: *I can say it needs more resources since the children have to use media in their learning. It also needs*

more time in training the teacher. The teacher will do a lot of work during the lesson because the learners will do their work in groups, then the teacher will just be supervising. Participant E also expressed similar sentiments: *I think by provision of adequate resources and more time from the school administration*.

The role of the teacher is to motivate learners to learn. This motivation includes providing resources. Resources can be used to connect learners with prior knowledge. The constructivist way of learning requires enough resources to achieve learning properly. Resources are used in interaction, manipulation and for discovery learning. Schools must have textbooks, a laboratory and varied learning resources for practical work. Teachers should make creative use of whatever resources are available such as newspapers, involving parents and the community, conventional resources such as textbooks, and new technologies. In so doing, they create the most advantageous conditions for learning and continually try to make learning as easy as possible for learners (Killen, 2019:6). Constructivist and active ways of learning help learners to learn more and to be independent. The New Approach explicitly states that learners must be actively involved in their learning to implement the skills and knowledge they acquire practically. Schools generally lack enough resources. Participants had only the chalkboard, books and notebooks in their classes. The constructivist learning environment needs enough resources for practical work to enhance learners' learning (Basheer, 2015:20). Constructivist individual and groupwork activities needs enough resources like the library and access to varied sources of information. Time is also an important matter in constructivist teaching and learning. Constructivist methods of teaching and learning are very time consuming. Learners need to be given enough time to do and complete tasks.

5.4 SUMMARY

This chapter shared the perceptions of eight primary school student teachers with regards to the practical application of constructivism. The study participants were doing their practicums in Gweru urban district in the Midlands province of Zimbabwe. Class observations showed the extent to which student teachers' pedagogy aligned with constructivist instruction design. The findings of this empirical research were reviewed carefully for alignment with each research question. The process related qualitative responses with each research question referenced to by primary school student teachers' perceptions of the practical application of constructivism. The depth of the topic was based on the responses

of the participants. Categories and themes were developed from analysing the data. The presentation of the qualitative quotes, that gave voice of the perceptions of the participants, was representative of the themes that emerged from the analysis.

The interviews revealed that student teachers have positive perceptions of the practical application of constructivism in the classroom. Participants described constructivism as a learner-centred approach which helped learners to learn deeper and understand better. The participants also shared their perceptions of the practical application of traditional approaches. They described traditional approaches as teacher-centred approaches which were less motivating.

The participants identified many approaches used in the practical application of constructivism in the classroom through exploring knowledge, discussions and active participation during learning. They argued that the practical application of constructivism provides learners with the opportunity to collaborate, discuss and reflect during learning. They also perceived that the practical application of constructivism changed the role and responsibility for both the teacher and the learners. They viewed the role of the teacher as that of facilitator of learning and saw the learners as being more responsible for their own learning. The study also revealed challenges faced by student teachers when they attempt to apply constructivism. The participants revealed challenges such as lack of support from mentors, overcrowding in the classrooms and shortage of resources in the schools. The process of analysis and presentation of narratives gave way to the conclusions and recommendations of the study that appear in Chapter Six.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The purpose of this study was to understand the perceptions of primary school student teachers with regards to the practical application of constructivism in the classroom. The intention was to consider the perceptions of the student teachers when designing teacher education programmes. This study may help other teacher educators to understand how student teachers feel about the practical application of constructivism in the classroom, as well as provide some guidelines to assist in future application of constructivism.

In this chapter the researcher summarises the literature review and key findings of the empirical study considering the main research question, sub-research questions and aims of the study as outlined in Chapter One (see section 1.7) and Chapter Four (see section 4.2). The researcher will make recommendations for the improvement of practice and possible future research. The chapter ends with the researcher acknowledging the limitations of the study and making an overall conclusion.

6.2 OVERVIEW OF THE RESEARCH

6.2.1 The Theoretical Framework of the Study

The study focused on studying primary school student teachers' perceptions of the practical application of constructivism in teaching and learning. The study was grounded in the constructivist learning theory as the theoretical framework. The theoretical framework was important because it served as a tool for interpreting the use of constructivism in the Zimbabwean context where the practical application of constructivism in teaching and learning is prescribed by policy (The New Approach). The constructivist learning theory is a learning theory which seeks to explain learners' acquirement of knowledge in a specific context. Constructivist pedagogy is regarded as more effective than traditional pedagogy, seeing that it maximises learners' learning. It is being used as the basis for current reform efforts in many countries in the world today. It is not a teaching theory as such which makes it different from the traditional teaching theories. The constructivist learning theory posits that learning is an active process where the learner is actively involved in learning, using prior knowledge. Constructivist theory grew out of several learning theories. Each theorist

contributed valuable ideas which inform current understandings of constructivist learning. Jean Piaget (1896-1980) and Lev Vygotsky (1896-1934) are two notable theorists who contributed the most current understanding of constructivist learning. All constructivist learning theorists are bound together by the belief that the learner is crucial in that he or she must be actively engaged in seeking and constructing meaning.

6.2.2 Literature Review

The literature review in this study focused on defining learning and explaining how it takes place. The literature reviewed comprised of theoretical and conceptual contributions to the concept of learning. The literature enabled the researcher to establish what is known and not known about the practical application of constructivism. The literature review also situated the study within the constructivist-interpretivist research design. In Chapter Two, traditional approaches to teaching and learning were studied. Behaviourist and cognitivist approaches to teaching and learning were discussed in detail. Traditional approaches were described as linear approaches to teaching and learning that do not adequately prepare learners to meet the demands of the twenty first century, which is characterised as an information age. In traditional approaches, the teacher has all the knowledge and the learners are empty vessels. In classrooms where traditional teaching and learning approaches are practised, the teacher is an authoritative figure who stands as the 'sage on the stage'. The teacher dominates all learning activities and the learners are passive recipients of knowledge. The teacher pours his or her knowledge into passive learners. There is little democracy in the classroom and the classroom atmosphere is autocratic. Alternative viewpoints are not encouraged. There is not much active participation by the learners in the traditional classroom. Assessment of learners is summative. Learners are tested for knowledge that is stored in their minds. Traditional approaches are seen as being poor in preparing learners for the demands of the twenty-first century, because in the absence of teacher's leadership, learners can do little on their own. Learners are not prepared to be independent in seeking for information.

Chapter Three focused on examining the constructivist learning theory. The constructivist learning theory, introduced into education in the 1980-199s, is seen as a new approach in education and very few teachers have adequate knowledge about constructivism though the perspective offers a lot of hope in preparing learners to meet the demands of the twenty-first century. Constructivist learning approaches endow learners with valuable learning skills. Learners develop, construct or rediscover knowledge as they attempt to make sense of their

universe and as they employ social constructivist ideals, which suggests that groupwork, language, and discourse are vital for learning. Constructivism is a learner-centred approach in which learners are actively involved in the learning process. Constructivism calls for a changed role of the teacher. The teacher in a constructivist learning situation becomes a facilitator of learning. Learners in a constructivist learning situation are independent and highly motivated to learn. Learning approaches used in a constructivist learning situation are diverse and complex. Constructivism leads to greater understanding by the learners where they retain more information and generate knowledge on their own. Assessment is both summative and formative. Constructivism can adequately prepare learners to meet the complex challenges of the twenty-first information century, which is marked by numerous technological advances and scientific discoveries.

6.2.3 The Empirical Study

The research focused on giving eight participants space to convey their perceptions of the practical application of constructivism. A qualitative approach to the study was adopted by the researcher. Qualitative researchers are interested in the depth of experience of those in the researched situation (Maxwell, 2018:11). The researcher was thus interested in the student teachers' perceptions of the practical application of constructivism. The researcher believed that by understanding student teachers' perceptions of the practical application of constructivism better, it would provide the basis for designing teacher education programmes that would help to improve skills in the practical application of constructivism by the student teachers, as stipulated in Zimbabwean policy.

In this interpretivist study, the researcher was concerned about how the student teachers constructed and interpreted the world around them with emphasis on the classroom context. Punch and Oancea (2014) posit that the philosophical basis of interpretivism is how individuals construct and interpret their experiences. According to Punch and Oancea (2014), the constructivist-interpretivist paradigm focuses on conscious experiences from a first-person point of view. The researcher in this study knew that primary school student teachers are encouraged to apply constructivist teaching strategies, hence the study on the practical application of constructivism in the classroom by student teachers, as well as by already qualified teachers.

The empirical study established that participants had a favourable perception of the practical application of constructivism. The study revealed that experienced teachers, who are mentors

for the students, still applied traditional approaches to teaching and learning hindering the application of constructivism in teaching and learning for students.

6.3 KEY FINDINGS FROM THE LITERATURE REVIEW AND EMPRICAL STUDY

Comparisons of the empirical and literature findings were done in Chapter Five. This section summarises the empirical and literature findings of this study in light of the categories and themes that emerged from the participants' responses in Chapter Five as well as in consideration of the main research question, sub-research questions and aims of the study which were outlined in Chapters One (see section 1.7) and Chapter Four (see section 4.2)

6.3.1 The Practical Application of Traditional Approaches in Teaching and Learning

According to du Plessis (2020:1), the adoption of constructivist pedagogy is a global challenge. The empirical findings revealed that experienced teachers still practised traditional approaches when teaching. According to Weimer (2012:67), "[e]volving to learner-centred approaches can be challenging. It is human nature to be uncomfortable with change". The continued use of traditional approaches by the experienced teachers had a negative effect on student teachers' efforts of practically applying constructivism in teaching for learner-centred learning. Student teachers did not receive the mentoring they needed to apply constructivist pedagogy.

Experienced teachers joined the teaching profession earlier and did not receive the training that would make them familiar with the constructivist learning theory. Many experienced teachers used traditional behaviourist approaches in their teaching to get good results and achievements from learners without their active participation in the learning process. The following themes were identified with the focus on the application of traditional teaching and learning approaches:

- **Theme 1: Student teachers' perceptions of the practical application of traditional approaches**

Participants mentioned that traditional approaches were prevalent in the schools. The practical application of traditional approaches by the experienced teachers hindered the shift to constructivism in the schools. Experienced teachers act as teacher mentors for the student teachers. Their inability to apply constructivism has a deleterious effect on the reform effort

in Zimbabwe specifically, but most probably in other countries as well. Mentoring is important for the knowledge and skills imparted to student teachers. Mentoring provides professional socialisation support to facilitate success in career transition (www.dera.ioe.ac.uk). Empirical findings indicate that the participants did not perceive the practical application of traditional approaches in the classroom where they did their practical teaching in a positive light. The relationship between the mentors who used traditional approaches and student teachers was discordant, because the participants did not benefit much from the relationship and their practical training.

The mentor teachers often focus on learning outcomes, rather than the process of teaching. Participants mentioned that traditional approaches concentrated more on teaching than on learning. They described traditional approaches as teacher centred with the teacher being more active in the learning process and learners largely passive. They observed that traditional approaches did not arouse learner interest in learning. Traditional classrooms focus on basic skills. Traditional approaches focus on studying the mind and model human thinking on computers. Their views of teaching and learning do not encourage the process of higher order thinking. Traditional approach-oriented teachers take the responsibility of transferring knowledge by focusing on facts. Assessment of learners is done separately from the teaching and is generally done by way of a test. A teacher is regarded as a good teacher if he or she can solve any type of problems in the classroom. Learners are not involved in the learning process. The teacher is given the authority to assess his or her learners by giving a test but the test given is not standardised (Hajal, 2019:536).

- **Theme 2: Challenges of practically applying traditional approaches**

Participants indicated that the application of traditional approaches disadvantaged learners, because the approach does not add to their motivation levels. The learners are not active in the learning process; therefore, they do not retain much information in their memory. In a traditional approach environment, the focus is on the teacher and the knowledge which he or she has. The classroom teacher is the purveyor of knowledge and learners are passive recipients of knowledge. The curriculum in a traditional approach is fixed and should be strictly adhered to by teachers. Learning is mainly based on repetition and recitation. The main study materials are textbooks and workbooks. The teacher is an authority figure who controls the class. Assessment is done through testing correct answers according to pre-prepared answer keys. Knowledge is seen as fixed and inert. Learners work primarily alone.

In a traditional learning environment, learners learn less, and they do not enjoy the experience when compared to learners in a constructivist learning environment. Learners are not adequately prepared to enter the twenty-first century information age. Learners do not acquire social skills such as cooperation, dialogue and tolerance.

6.3.2 The Practical Application of Constructivism in the Classroom

The empirical and literature findings confirmed student teachers' perceptions about the practical application of constructivism. The participants regarded constructivism as an approach that led to more understanding and better learning. Constructivism is a relatively new theory of learning in education, although it has been existence for a long period of time. Many countries try to reform teaching and learning policies by including constructivist approaches, but teachers find it easier to use traditional approaches. Constructivism is a learner-centred approach to learning where the learners are actively involved in their own learning. The teacher's role is that of a facilitator or guide in a constructivist learning situation where context is an important factor.

- **Theme 1: Student teachers' perceptions of the practical application of constructivism**

The empirical evidence and literature findings confirmed that constructivism is more concerned with learning than with teaching. The participants revealed that they understood the practical application of constructivism as a learner-centred approach to teaching and learning. The participants mentioned that during the practical application of constructivism, learners are placed at the centre of the instructional process. They also mentioned that the practical application of constructivism involves a variety of teaching methods and learners are treated equally. The participants showed an awareness of what the practical application of constructivism entailed in terms of defining the concept, the teaching methods and strategies involved. The participants recognised the learners' participation and collaboration during lessons, and the need for learners to be actively involved in their own learning. Constructivist learning is active and interactive in nature. Constructivist teaching and learning requires effort from both learners and teachers. Learners and teachers become partners in the learning–teaching process (Hajal, 2019:539). The teacher is more involved in planning and guiding social interactions that allow learners to create knowledge within a social context.

The participants mentioned that the practical application of constructivism focused on the talents, interests, capacities and needs of learners. The practical application of constructivism generally involves methods of teaching that move the focus of instruction from the teacher to active learning by the learner. Aspects such as active learning, learner commitment and the construction of own knowledge are among the principles of learner-centred teaching (du Plessis, 2020:1). The constructivist viewpoint combines an emphasis on knowledge acquisition of individual learners within cooperative learning contexts, taking cognisance of their experiences, perspectives, backgrounds, talents, interests, abilities and needs, with a focus that encourages inspiration and achievement for all learners (Seel, 2012).

- **Theme 2: Advantages of the practical application of constructivism**

Participants confirmed literature findings about the advantages of the practical application of constructivism in the classroom. The participants' emphasised that the practical application of constructivism offered learners advantages such as greater insight into learning content, the ability to complete tasks individually and independently from teacher input, better performance, improved motivation and confidence. Literature findings add to participants' responses. In constructivist learning, learners develop better communicative and collaborative skills (du Plessis, 2020:7). The practical application of constructivism also focuses on solving problems, constructing arguments, reflecting critically and applying information practically, as well as assimilating knowledge (Weimer, 2012).

The participants indicated that learners achieved deeper understanding, personal and individualised attention. In that way, learners retain information for a longer period and become lifelong learners. They viewed the above advantage as invaluable for learners. The participants mentioned that the practical application of constructivism entailed giving individual learners more opportunities to learn by taking diversity into account. Participants indicated that constructivism leads to greater independent and motivated learning by the learners. These are crucial skills for preparing learners for a world of information explosion.

The principles of practically applying constructivism in teaching and learning can be applied at all grade levels and in all subjects. Strategies like learner engagement, active learning and other practices which involve learners in their own learning, are important components of the practical application of constructivism. The practices, however, do not represent the entirety of what it means to be a constructivist teacher. Groupwork is accentuated and learners learn

to collaborate and communicate with one another (du Plessis, 2020:4). Communication and collaboration are interpersonal skills that enable learners to work together, as well as to learn to understand diverse groups of people, to discover knowledge together, to negotiate and to cultivate trust.

Constructivism develops learners' ability to be self-directed learners, ask questions and complete tasks independently. Self-directed learning implies learners making their own choices and determining their own goals. It also involves internally driven self-motivation, viewing problems as challenges, desiring change and enjoying learning (www.impactteachers.com/self-directed-learners-in-classrooms). Learners take part in learning activities when they can interact with others through for instance, groupwork. Classroom interaction and participation include interaction and participation between teacher and learners, between learners and teacher and between learners and learners (Brame & Biel, 2015). The participants indicated that the practical application of constructivism promotes motivation. The practical application of constructivism resulted in learners becoming more motivated to learn. This results in higher achievement and heightened learner motivation. When constructivist pedagogy is used, learners feel more important and cared for (see du Plessis, 2020:7).

- **Theme 3: Challenges of the practical application of constructivism**

The empirical and literature findings confirmed the challenges that are met when applying constructivism in teaching and learning, especially in developing countries like Zimbabwe. Participants faced challenges of overcrowded classrooms, time constraints and shortages of learning resources. The challenges made it difficult for the participants to be effective in applying constructivist pedagogy. The participants raised concerns about very large classes where huge numbers of learners sit near to each other. The participants revealed that they struggled to teach in overcrowded classrooms, because individual problems could not be addressed in such situations. Even the best teaching strategies have no effect in overcrowded classrooms (see du Plessis,2020:8). Assessment was not always possible in the large classes, because of disorderly behaviour and disciplinary problems. According to du Plessis (2020:5),teachers in large classes often must manage many learners' activities simultaneously, which can be challenging when learners are working on different stages of an identical project. Learners may miss vital information from teachers when there are disciplinary problems. Some learners may choose to work alone, making groupwork a

challenge. Teachers are, thus, often restricted to the 'chalk-and-talk' teaching technique, which means there is no variety in teaching strategies. There is for example, a lack of higher order thinking and lively discussions about contentious issues in overcrowded classrooms.

The constructivist learning environment must provide space and conditions for personal and individual construction of knowledge, as well as sharing of knowledge within a group context. Constructivism is a social and epistemological view which emphasises learning rather than teaching. Constructivist pedagogy posits that certain activities such as debates with more experienced persons, hands-on activities, broad life experiences and practical experiments can enhance the meaning making process. Constructivist pedagogy requires active learning and competitive environments.

The student teachers faced problems of time constraints. The participants indicated that the practical application of constructivism is time consuming and that they did not have enough time for the practical application of constructivism in the classrooms where they did their practical teaching. In a constructivist learning situation, learners should be allowed to make progress at their own pace, but it was not practical in a situation where specific lessons were scheduled within a specific timeframe. The problem of shortage of time linked up with disciplinary problems in overcrowded classrooms. Overcrowding makes it difficult to manage the learners and a lot of time is lost in enforcing discipline. Learners should be actively involved in their learning to implement skills and knowledge they acquire practically. Learners should be able to express what they learned.

Participants also faced challenges of shortages of teaching and learning resources. In overcrowded classrooms all learners may not have the opportunity to learn because they are not able to access learning material and be able to express themselves. For example, cooperative learning is used for tasks which will be time consuming if only one learner did all the work. The task should be divided into parts, so that each learner in the group could participate and be involved in the result. The teacher should ensure that each group has a reasonable experience of success in their work to boost confidence and increase motivation. Constructivism emphasises the creation of authentic learning situations, where all senses are stimulated.

6.3.3 Assisting Student Teachers with the Practical Application of Constructivism

The empirical findings reveal that student teachers have a good theoretical understanding of constructivism but face three serious challenges regarding the practical application of constructivism, namely support from the lecturers and mentors and the provision of resources in the schools.

- **Theme 1: Constructivism is a highly skilled approach.**

Empirical and literature findings confirmed that constructivism is a highly skilled approach to teaching and learning. The teacher, using a constructivist approach, needs to have thorough subject content knowledge and methodological skills for the effective practical application of constructivism. Participants noted that constructivism places a heavy burden on the teacher. The teacher must engage learners in challenging experiences to prompt learners' existing knowledge.

Teachers must have a strong theoretical and practical background of the constructivist way of teaching and learning. Teachers should understand and promote the use of learning strategies based on the theories of Piaget and Vygotsky to provide a constructivist learning environment for learners. A teacher should make use of cognitive science terms like 'predict', 'analyse' and 'develop' for learners' activities. The teaching methods which are based on constructivist views, are the actual practices derived from cognitive psychology that help learners to understand the topics to be learnt, recall and apply essential information when necessary, as well as to understand the concepts and skills to be mastered. These are used to make the lesson relevant to the learners' contextual understanding by activating learner's prior knowledge to related topics. Important concepts of these perspectives include advance organisers, analogies and elaboration. Vygotsky's (1978) ideas have several positive implications for practice in the classroom which include the use of language, the role of the flexible and sensitive teacher, a formative approach to assessment and the avoidance where possible of subject-specific learning.

The skill of the teacher is vital in assisting learners to carry out tasks within their ZPD. Effective constructivist practice depends upon the teacher's awareness of the original zone of current development (ZCD) and the extent of the zone of proximal development (ZPD), coupled with the recognition of the progress being made. Success is largely dependent on the level of adaptability to learner needs (Gould, 2012:118). According to Ireson (2008:98),

"providing such sensitivity calibrated support can be very demanding as it calls for the learner to remember details about their performances".

The teacher's skill is central in the process of scaffolding and to endeavour to help learners reach their potential. Scaffolding is a gradual process which is responsive to learners' progress. Scaffolding of learners requires the application of a wide range of teaching skills applicable for each individual learner. The teacher should have well developed skills in motivating, demonstrating, prompting and questioning. The teacher must be able to decrease the level of interaction when progress is being made and increasing it when difficulties are being experienced. A teacher should modify the degree of help to match the needs of the individual learner and adapt instruction according to the reactions of the learner. This does not only improve the learner's cognitive development, but it also enhances the teacher's capacity to refine his or her own instructional practices. Vygotsky indicated that teachers should support learners in solving problems at a higher level, to reach their ZPD. This is not a matter of telling the learner how to solve the problem by himself or herself but points to the skill of the teacher in directing learners in the right direction so that the learner can internalise and make sense of the task's needs so that in future he or she will be able to solve similar problems.

In teacher education programmes, student teachers should engage with theoretical information about constructivist theory. A constructivist teacher must be effective in the use of tools and strategies like conversation, discussion and inquiry to involve learners in communication and thinking. Teachers should develop individual learning methods like discovery learning and social interactive activities like collaborative learning by understanding communication tools and learning strategies. When student teachers do their practical teaching at schools, they need to be able to apply the theoretical knowledge, which seems to be problematic because of a lack of support from mentors.

- **Theme 2: Improving the quality of student teachers' training programmes**

The quality of teacher education programmes is very important in helping student teachers with the practical application of constructivism. Improving the quality of teacher education programmes is crucial for the success of the reform effort. Participants indicated that the quality of teacher education programmes must be improved. Worldwide, the thorough preparation of teachers is crucial. Quality teacher education programmes will ensure that

teachers who are well versed with the theoretical and practical aspect of the application of constructivism are produced. According to du Plessis (2020:1), teacher education institutions should establish whether they offer suitable qualifications that empower student teachers to cope with the many difficulties in teaching, including the practical application of constructivism.

The teacher in constructivist learning provides and facilitates a learning environment. To be able to do so effectively the teacher must know the theoretical base of the constructivist approach. The application of specific teaching methods within the constructivist approach leads to a constructivist learning environment in the classroom. Student teachers must be guided on how to motivate learners to learn. The guidance must include developing skills on how to improvise resources, how to pose appropriate problems, questioning techniques, and how to connect the questions and resources to the learners' prior knowledge. Student teachers must be taught how to take the responsibility for guiding learners and facilitating learning so that learners themselves try to learn using the teacher's facilitation.

Theme 3: Mentor teachers constitute an important component of the reform effort

The relationship between the mentor teacher and the student teacher is an important aspect in the reform effort towards using constructivism in the classroom. Student teachers join a community of practice when doing practical teaching at a school. According to du Plessis (2020:2), schools offer student teachers an opportunity to convey competences through direct participation in teaching activities. Mentoring is important because of the knowledge and skills student teachers can learn from the mentor teachers. A mentor teacher may share with a mentee information about his or her own career path, as well as provide guidance, motivation, emotional support and role modelling (www.Washington.edu>doit>what-role-mentor). Mentoring in a specific context allows student teachers to acquire context specific knowledge and to develop situation-based skills which can be transferred to similar situations. Quality mentoring can greatly enhance a student teacher's success.

- **Theme 4: Adequate resources are essential for the effective classroom practical application of constructivism**

Piaget (2013) defined knowledge as an interaction between subject and object. Knowledge is the personal construction made by exchanges between new information and prior knowledge.

The provision of adequate learning material is very important for the practical application of constructivism. Constructivists propose that learning is individually or socially constructed by learners, rather than simply being received from the teacher. Everyone mentally constructs his or her world of experience through cognitive processes. It therefore becomes important to integrate authentic, reflective and collaborative learning experiences when planning for the practical application of constructivism. The constructivist learning theory states that learning occurs when one constructs both the mechanism for learning and his or her own unique version of the knowledge. This means that in the classroom, knowledge must be constructed by the learner. According to Makewa (2019:27), the construction of knowledge is a dynamic process that requires the active engagement of the learners who will be responsible for their own learning while the teacher only creates an effective learning environment. The role of the constructivist teacher is to create a learning environment that is invigorating, interactive, immersive, informative, collaborative and innovative.

The constructivist way of learning requires enough learning material in order to achieve successful learning. There is a glaring lack of technology integration in many of the classrooms in developing countries. Other resources include textbooks, computers, laboratories for practical work and libraries for learning.

6.3.4 Drawing a Conclusion

To answer the main research question: *How do primary school student teachers perceive the practical application of constructivism in teaching and learning?* the following conclusion is given. The findings were presented by reflecting on the voices of the participants in the narrative format. The perceptions of the participants were linked to the existing literature as well as the theoretical framework. Many of the participants of this study had a favourable perception of the practical application of constructivism. The participants pointed out that the practical application of constructivism provided learners with valuable learning skills. They indicated that the practical application of constructivism led to learner-centred teaching and learning where learners were actively involved in the learning process. The participants indicated that the practical application of constructivism led to highly motivated learners, high retention of learning material by the learners, independent learning and the development of lifelong learning skills by the learners. The participants described the practical application

of constructivism as a hands-on approach where the teacher needed to be up-to-date with subject content material and teaching skills.

The participants indicated that they also faced challenges in the practical application of constructivism, because of mentor teachers who did not effectively help them with the practical application of constructivism in the classroom. The mentors continued to apply traditional approaches in teaching and learning which did not help the participants much. Another challenge was the shortage of teaching resources in the schools. They also complained about teaching programmes which were not fully developed at the college where they studied.

6.4 RECOMMENDATIONS

Constructivism is a new global approach to teaching and learning that is increasingly being encouraged in education today. In Zimbabwe, the New Approach was made policy, to encourage teachers to use constructivist learning approaches. The empirical study was done with student teachers from Zimbabwe and even though the findings of this study were not intended to be generalised to student teachers from other teacher education/training institutions, many of the following recommendation might be useful for other institutions locally and for teacher training in other countries.

Ministry of Science and Technological Development, Higher and Tertiary Education

- More research on the constructivist learning theory and its practical application is necessary. The practical use of constructive learning might not be clear for many of the teachers and there is very little research done in this area. Teachers are not knowledgeable enough in pedagogical applications. Pedagogical knowledge is good knowledge of various ways in which content can be transferred (Basheer, 2015:2). Teachers teach the way they have learnt in school or in their own training. Learners in most cases are passive in the class and do not actively participate in learning activities.
- Teachers should be encouraged to apply constructivist learner-centred strategies in their classrooms. They must shift their instructional approaches from being teacher-centred to being learner-centred. To close the gap between theory and practice, it is recommended that teachers understand the nature of knowledge required from them. They need to embark on life-long professional improvement through attending

workshops and undertaking research projects in order to build an understanding of constructivist learning theory. Mentor teachers need to be role models to student teachers in this regard.

The Ministry of Primary and Secondary Education

- To improve the quality of education in Zimbabwe, a concerted effort and coordination between the Ministry of Primary and Secondary Education, teacher education institutions, school administrators and school teachers, learners and their parents is needed to help classroom teachers shift to constructivist approaches. Comprehensive strategic planning is required to achieve the goal. The Ministry of Primary and Secondary education, Teacher education/training institutions and the Curriculum Development Unit (CDU) must work together to develop guidelines for enriching and enhancing constructivist approaches in the schools.
- Experienced teachers should be more open and welcoming of new teaching ideas to improve their teaching skills. Teachers in Zimbabwe have used teacher-centred approaches for a long time and so it is hard for them to move a constructivist way of instruction and implement it appropriately. As for mentor teachers, if they are not trained to guide learners to be independent and to search for new knowledge, then they cannot be expected to mentor student teachers in the correct way. It is recommended that teacher education institutions hold regular workshops with the mentor teachers as one way of helping experienced teachers to adopt constructivist learning approaches.
- Methodological workshops, and demonstration lessons from good constructivist teachers on the constructivist way of teaching and learning should be organised for teachers. Lessons on good constructivist learning can also be recorded from the schools for demonstrative purposes. It is recommended that constructivist learning approaches, which are shown in these workshops, be based on constructivist learning strategies such as peer learning, group working, discovery and discussion. The aim of the workshops would be to familiarise teachers with active and constructive learning to enable them to teach in a specific way.
- Schools lack learning resources for use by learners. Constructivist learning requires enough resources in order to achieve successful learning. Constructivist individual and group work needs adequate resources like libraries, conventional textbooks and

technological gadgets. It is recommended that the Ministry of Primary and Secondary Education muster resources necessary for constructivist pedagogy. Workshops should be organised on how teachers can improvise and make resources for constructivist learning on their own.

Teacher Education Colleges

- Teacher education colleges are responsible for good training of the student teachers who participate in their programmes. Teacher education colleges should continue to review teacher education curricula and redesign them in line with policy and expectations from the government. It is imperative to recognise the importance of teaching student teachers how to learn and teach so they can apply lifelong learning throughout their careers.
- The teaching of constructivist learning theory in teacher education institutions must be more explicit. Student teachers must fully understand the importance of constructivist learning theory. They need to be trained to apply constructivist pedagogy in classrooms for a better learning experience for learners. Student teachers must learn that traditional methods should be replaced by constructivist pedagogy. This has specific implications for their practicums, as student teachers need to obtain the abilities and self-assurance essential to impose discipline and teach large numbers of learners within a single classroom using constructivist approaches.
- Lecturers should strive to provide valuable opportunities for student teachers to develop competence in the practical application of constructivism that will better equip them for their professional development. Student teachers should understand and apply the principles and strategies of constructivist pedagogy, such as learning through working together, learning to deal with others, solving problems together and gaining collaboration and communication skills,
- The participants showed that they were not fully aware of the benefits and advantages of the practical application of constructivism. The constructivist learning theory emphasises the construction of knowledge by learners, depending on among other things, their experiences, talents, beliefs, values and reflections. These aspects should form the basis of the practical application of the constructivist learning theory.
- There is a need to enhance the practical application of the principles of constructivist pedagogy in study material. Student teachers should be encouraged to implement

learner-centred teaching and to use a mixture of teaching strategies in their lessons to ensure that all their learners' needs are met. To facilitate such implementation, simulation and more practical examples of learner-centred teaching could be included in the study material for the student teachers. Student teachers can record lessons and play in class for constructive criticism and learn from each other. YouTube videos should be used for practical guidelines in specific subject areas.

- The challenges which the student teachers are facing revolve around support from the lecturers and mentor teachers and the provision of learning materials in the schools. It is recommended that there be an improvement in this regard. Support from lecturers should also be enhanced. Student teachers need a great deal of support from their lecturers and guiding principles regarding the practical application of constructivism. The same should be expected from the mentors.
- More practice at college should be done by giving lessons in front of other students and lecturers to learn from others and to discuss possible changes to make lessons more constructive in nature.

Experienced Teachers

- Experienced teachers play the most important role in making learning happen. Their role and perception of different teaching approaches is critical when implementing constructivist pedagogy. Experienced teachers should seek to change their teaching for more effective learning by their learners.
- Experienced teachers should undergo training to apply strategies to guide, help and facilitate learning. They should provide the learners with opportunities to build knowledge based on previous knowledge. Teachers should know and understand the fact that learners should be engaged in every single learning activity as the centre of the process. Every group work member must be given a have task.
- Experienced teachers should demonstrate how to make learners more productive and motivated while practising active learning strategies. Experienced teachers must scaffold learners through activating prior knowledge from one grade to the next.
- When learner and teacher-centred approaches are used together, learners can enjoy the positives of both types of education (du Plessis, 2020:4). Instead of losing interest in teacher-centred education or losing sight of their objectives in a completely learner-centred classroom, learners can benefit from a well-balanced educational atmosphere.

It is recommended that a limited range of effective teaching strategies from both sides can be used in overcrowded classes such as the question-and-answer method and guided practice.

- The constructivist learning theory posits that each learner builds his or her world of experience through cognitive and emotional processes. It is thus essential to integrate authentic reflective and collaborative learning experiences for the learners when designing programmes that embrace constructivist learning approaches.
- Mentor teachers are very important in helping student teachers develop skills in the practical application of constructivism. Good communication should be maintained between colleges and mentors in order to help mentees/student teachers. Workshops should be held if mentor teachers are not clear about expectations. Lecturers from teachers' college should hold workshops with mentor teachers where they discuss and organise intervention measures with regards to the challenges confronting student teachers in practical circumstances, in particular the practical application of constructivism.
- Traditional and constructivist strategies are both essential and should not be eliminated from the learning process. The teacher is very important in the learning process and is the facilitator of learning. Without the teacher, learning will not take place. Classroom teachers are encouraged to remain in control of the learning situation but as facilitators.

Student Teachers

- The relationship between the mentor teachers and student teachers is vital. The relationship should be fostered by both parties for the student teachers to gain self-confidence and self-assurance. Self-confidence and self-assurance are characteristics that are essential for the professional development of student teachers. The student teachers should know exactly what constructivism means and how to apply it in the classroom in specific subject areas. In accordance with the constructivist learning theory, learning is rooted in making sense of real-life situations, such as in the practical application of constructivism. The mentoring that student teachers receive during their years of training should also empower them to build knowledge of, and tactics aimed at dealing with instilling discipline and managing overcrowded classrooms, for the application of constructivism.

- Channels of communication between lecturers, mentor teachers and student teachers should be opened. One-to-one sessions between lecturers should be followed by a one-to-one session between the mentor teacher and the lecturer and, then a group discussion between the lecturer, mentor teacher and student teacher.
- Student teachers should be conscious of the value of scaffolding in learners' cognitive development. The skill to scaffold is at the heart of how lessons are planned, how resources are selected, what teaching and learning strategies are employed, how questions are asked and how feedback is given (Aubrey & Riley, 2016:56). The scaffolding skill of the teacher is paramount when making the major points of a problem or a task clear.
- More thought needs to be given to question construction. The main job of a constructivist teacher is to ask good questions which encourage learners to explain their answers. This requires the appropriate use of open-ended and closed questions which would normally be used to check knowledge or to help learners structure their thoughts. Open-ended questions stimulate creative thinking with more confident learners. Closed questions are normally used to check prior knowledge to help learners structure their thoughts.
- Time management is also a crucial skill to develop for the student teachers. Learners should be given enough time to perform their individual work constructively. Tasks given by the teacher should be within the zone of proximal development of the learner.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

Constructed on the findings of this study, recommendations for future studies include the following considerations:

- The findings reveal six neglected aspects that need to be addressed and researched further regarding the practical application of constructivism in teaching and learning, namely (1) student teachers' lack of theoretical and practical knowledge and skills about the importance, benefits, and advantages of the practical application of constructivism; (2) the negative influence of overcrowded classrooms on the practical application of constructivism; (3) a need for managing discipline in classrooms; (4) resource mobilisation for the effective practical application of constructivism; (5) how

mentor teacher and student teacher relationships can further be improved; and (6) learner performance when constructivist learning strategies are applied.

- In Zimbabwe, there is little research on examining classroom teachers' knowledge and perceptions of constructivist theories. The findings of this study should not be viewed as an end in themselves. It is recommended that more in-depth qualitative research in schools and higher education be conducted to study classroom teachers' knowledge and perceptions of different constructivist theories.
- If the student teachers have not acquired the necessary skills during their training, they might find the practical application of constructivism overwhelming during practicums. The research reported on in this study merely touched on student teachers' perceptions of the practical application of constructivism in teaching and learning. Further research is recommended in this regard, as the practical application of constructivism is complicated, yet rewarding when applied to teaching and learning.
- The study was limited to primary school student teachers teaching Grades 3 to 7.Future research should consider early childhood development student teachers and secondary school student teachers.
- The participants for this study were limited to those doing their practicums in an urban setting. Future research might study the perceptions of those doing their practicums in a rural setting.

6.6 LIMITATIONS OF THE STUDY

Creswell (2013) refers to limitations of qualitative research as inherited. Several limitations existed in this study, namely the sampling size for this constructivist-interpretivist study included only eight participants who were sampled from one teacher education/training institution. The findings may not be generalisable to other student teacher populations in other locations or other student teachers from different teacher education/training institutions. The issue of lack of generalisability is a common feature in most qualitative research (see MacMillan & Schumacher, 2010).

The limited class grades taught by the participants can also be considered as a limitation. Participants were only drawn from primary school student teachers teaching Grades 3 to 7.As a result, no assumptions can be made for other student teacher programmes such as early childhood development student teachers and secondary school student teachers.

In a qualitative study, another limitation to consider is the subjectivity of the researcher which may lead to bias about the subject. The researcher is a Psychology of Education lecturer at the teacher education institution from which the participants were drawn. There could be a biased viewpoint in interpreting data because of the subjectivity of the researcher. In this qualitative study, the researcher was the primary source of data collection and analysis. Some perceptions of the participants might be overlooked, while others might be overemphasised because of researcher bias. The researcher acknowledges any bias which he might have had with regards to the practical application of constructivism. The researcher tried to overcome bias by studying the data numerous times for patterns from different points of view or perspectives.

The main focus of this study was to investigate student teachers' perceptions of the practical application of constructivism in teaching and learning during their practicums. Caution needs to be taken in drawing generalised conclusions in a study of this nature where only student teachers from one teacher training institution were used as participants. However, the findings of this study provide evidence that the perceptions of the student teachers with regards to the practical application of constructivism might be a valid priority that needs attention at all teacher training institutions.

6.7 CONCLUSIONS

In this study, the researcher studied student teachers' practical application of constructivism. Constructivism is increasingly gaining acceptance as a reform effort in teaching and learning in schools and therefore more teachers will be required to apply constructivist pedagogy in their practice. Therefore, a better understanding of student teachers' perceptions of the practical application of constructivism will inform the Ministry of Higher and Tertiary Education, Science and Technological development on how to improve the teaching of constructivist learning theory in teacher education programmes.

The findings of this study show that the shared perceptions of the student teachers regarding constructivism put emphasis on a learner-centred approach where learners are actively involved in their own learning. Teachers need to change their attitudes and beliefs regarding the adoption of appropriate teaching methodologies. Teachers need support in the form of professional development and policies that are broadly applied. Professional development would provide teachers with increasingly sophisticated implementation strategies for

constructivist learning. The strategies would provide support on the development of learning activities that require learners to construct knowledge using resources available.

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APPENDICES

Appendix A: Ethical clearance

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/10/16

Ref: **2019/10/16/53310802/12/MC**
Name: Mr B Mavesere
Student No.: 53310802

Dear Mr Mavesere

Decision: Ethics Approval from 2019/10/16 to 2024/10/16

Researcher(s): Name: Mr B Mavesere
E-mail address: bmavesere@yahoo.co.uk
Telephone: +263 77 242 2440

Supervisor(s): Name: Prof E Venter
E-mail address: ventee1@unisa.ac.za
Telephone: +27 12 429 4751

Title of research:

Perceptions of primary school student teachers of the practical application of constructivism

Qualification: D. Ed in Education Foundation

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 2019/10/16 to 2024/10/16.

*The **low risk** application was reviewed by the Ethics Review Committee on 2019/10/16 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(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. 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.

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. 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.
5. 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.
6. 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.
7. No field work activities may continue after the expiry date **2024/10/16**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2019/10/16/53310802/12/MC** *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
CHAIRPERSON: CEDU RERC
motlhat@unisa.ac.za

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

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
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Appendix B: Request to conduct research at the teachers' college

Mkoba Teachers College
P O Box Mk20
Mkoba
Gweru

04 October 2019

The Permanent Secretary
Ministry of Higher and Tertiary Education, Science and Technology Development
P Bag CY 7732
Causeway
Harare

Dear Sir

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT MKOBA TEACHERS COLLEGE

I am kindly requesting permission to conduct research at Mkoba Teachers College. The title of my research study is *Perceptions of primary school student teachers regarding the practical application of constructivism.* I am doing research under supervision of Prof Elizabeth Venter in the Department of Psychology of Education towards a PhD at the University of South Africa.

The aim of the research is to study the perceptions of primary school student teachers of the practical application of constructivism. The college has been selected because it is involved in the training of primary school student teachers in Zimbabwe. The study entails observing and interviewing student teachers on teaching practice. The benefits of the study are that new information will be provided on the practical application of constructivism. The information has the potential to enhance the understanding, by teacher educators and practicing teachers, of what is helpful in the classroom application of constructivism. There are no potential risks that are envisaged. There will be no reimbursement or any incentives for participants in the research.

Participants are entitled to feedback. Feedback procedures will entail giving the participating student teachers an opportunity to read the transcribed notes after the interviews for their edition. The thesis of this study will be available in UNISA's library. The findings will be communicated to the participants in an appropriate manner by means of a workshop. The findings will also be made available electronically on request to the college, student teachers, the Ministry of Primary and Secondary Education and the Ministry of Higher and Tertiary Education, Science and Technology Development.

Yours sincerely

Mavesere Benjamin
EC No. 0042673H
Dept/Stn 2760/2400

Appendix C: Permission to conduct research at the teachers' college

All official communications should be addressed to:
"The Secretary for Higher & Tertiary Education
Telephones: 795891-5, 796441-9, 730055-9
Fax Numbers: 792109, 728730, 703957
E-mail: thesecretary@mhet.ac.zw

ZIMBABWE

Reference:

MINISTRY OF HIGHER AND TERTIARY EDUCATION, SCIENCE AND TECHNOLOGY DEVELOPMENT
P. BAG CY 7732
CAUSEWAY

04 November 2019

Mr B. Mavesere
Mkoba Teachers College
GWERU

Mr Mavesere,

REQUEST FOR AUTHORITY TO CARRY OUT RESEARCH ON "PERCEPTIONS OF PRIMARY SCHOOL STUDENT TEACHERS OF THE PRACTICAL APPLICATION OF CONSTRUCTIVISM": MINISTRY OF HIGHER AND TERTIARY EDUCATION, SCIENCE AND TECHNOLOGY DEVELOPMENT

Reference is made to your letter in which you requested for permission to carry out a research on **"PERCEPTIONS OF PRIMARY SCHOOL STUDENT TEACHERS OF THE PRACTICAL APPLICATION OF CONSTRUCTIVISM": MINISTRY OF HIGHER AND TERTIARY EDUCATION, SCIENCE AND TECHNOLOGY DEVELOPMENT.**

Accordingly, please be advised that the Head of Ministry has granted you permission to carry out the research.

It is hoped that your research will benefit the Ministry and it would be appreciated if you could supply the office of the Permanent Secretary with a final copy of your study, as the findings would be relevant to the Ministry's strategic planning process.

S. Nhenjana (Mr)
Deputy Director - Human Resources
FOR: PERMANENT SECRETARY

MINISTRY OF HIGHER TERTIARY EDU,
SCIENCE & TECHNOLOGY DEV
DEPUTY DIRECTOR HUMAN RESOURCES
NOV 2019
P. BAG 7732, CAUSEWAY
ZIMBABWE

PRINCIPAL
MKOBA TEACHERS' COLLEGE

Appendix D: Request to conduct research in primary schools

Mkoba Teachers College
P O Box Mk20
Mkoba
Gweru

19 November 2019

The Permanent Secretary
Ministry of Primary and Secondary Education
P Bag CY 121
Causeway
Harare

Dear Sir

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN PRIMARY SCHOOLS IN GWERU

I am kindly requesting permission to conduct research involving student teachers from Mkoba Teachers College doing their teaching practice in primary schools in Gweru. The title of my research study is *Perceptions of primary school student teachers regarding the practical application of constructivism.* I am doing research under supervision of Prof Elizabeth Venter in the Department of Psychology of Education towards a PhD at the University of South Africa.

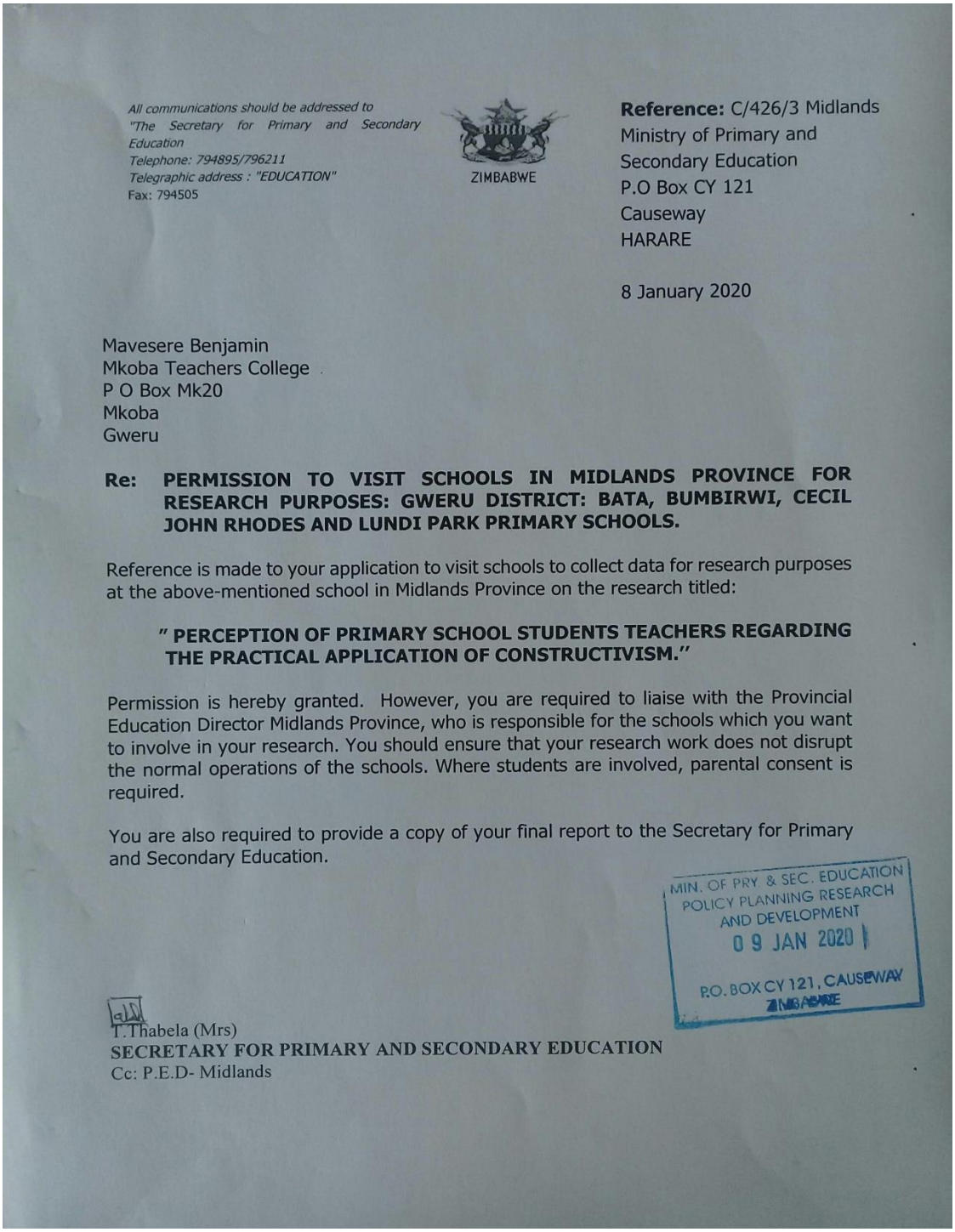
The aim of the research is to study the perceptions of primary school student teachers of the practical application of constructivism. The college has been selected because it is involved in the training of primary school student teachers in Zimbabwe. Schools in Gweru have been targeted because of convenience. They are close to the researcher. The study entails observing and interviewing student teachers on teaching practice. The benefits of the study are that new information will be provided on the practical application of constructivism. The information has the potential to enhance the understanding, by teacher educators and practicing teachers, of what is helpful in the classroom application of constructivism. There are no potential risks that are envisaged. There will be no reimbursement or any incentives for participants in the research.

Participants are entitled to feedback. Feedback procedures will entail giving the participating student teachers an opportunity to read the transcribed notes after the interviews for their edition. The thesis of this study will be available in UNISA's library. The findings will be communicated to the participants in an appropriate manner by means of a workshop. The findings will also be made available electronically on request to the college, student teachers, the Ministry of Primary and Secondary Education and the Ministry of Higher and Tertiary Education, Science and Technology Development.

Yours sincerely

Mavesere Benjamin
EC No. 0042673H
Dept/Stn 2760/2400

Appendix E: Permission to conduct research in primary schools



All communications should be addressed to
"The Secretary for Primary and Secondary Education
Telephone: 794895/796211
Telegraphic address : "EDUCATION"
Fax: 794505

ZIMBABWE

Reference: C/426/3 Midlands
Ministry of Primary and
Secondary Education
P.O Box CY 121
Causeway
HARARE

8 January 2020

Mavesere Benjamin
Mkoba Teachers College
P O Box Mk20
Mkoba
Gweru

Re: PERMISSION TO VISIT SCHOOLS IN MIDLANDS PROVINCE FOR RESEARCH PURPOSES: GWERU DISTRICT: BATA, BUMBIRWI, CECIL JOHN RHODES AND LUNDI PARK PRIMARY SCHOOLS.

Reference is made to your application to visit schools to collect data for research purposes at the above-mentioned school in Midlands Province on the research titled:

" PERCEPTION OF PRIMARY SCHOOL STUDENTS TEACHERS REGARDING THE PRACTICAL APPLICATION OF CONSTRUCTIVISM."

Permission is hereby granted. However, you are required to liaise with the Provincial Education Director Midlands Province, who is responsible for the schools which you want to involve in your research. You should ensure that your research work does not disrupt the normal operations of the schools. Where students are involved, parental consent is required.

You are also required to provide a copy of your final report to the Secretary for Primary and Secondary Education.

MIN. OF PRY. & SEC. EDUCATION
POLICY PLANNING RESEARCH
AND DEVELOPMENT
09 JAN 2020
P.O. BOX CY 121, CAUSEWAY
ZIMBABWE

T.Thabela (Mrs)
SECRETARY FOR PRIMARY AND SECONDARY EDUCATION
Cc: P.E.D- Midlands

Appendix F: Request to conduct research at the teachers' college

Mkoba Teachers College
P O Box Mk20
Mkoba
Gweru

11 November 2019

The Principal
Mkoba Teachers College
P o Box Mk20
Mkoba
Gweru

Dear Madam

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT MKOBA TEACHERS COLLEGE

I am kindly requesting permission to conduct research using student teachers at Mkoba Teachers College. The title of my research study is *Perceptions of primary school student teachers regarding the practical application of constructivism.* I am doing research under supervision of Prof Elizabeth Venter in the Department of Psychology of Education towards a PhD at the University of South Africa.

The aim of the research is to study the perceptions of primary school student teachers of the practical application of constructivism. The college has been selected because it is involved in the training of primary school student teachers in Zimbabwe. The study entails observing and interviewing student teachers on teaching practice. The benefits of the study are that new information will be provided on the practical application of constructivism. The information has the potential to enhance the understanding, by teacher educators and practicing teachers, of what is helpful in the classroom application of constructivism. There are no potential risks that can be envisaged. There will be no reimbursement or any incentives for participants in the research.

Participants are entitled to feedback. Feedback procedures will entail giving the participating student teachers an opportunity to read the transcribed notes after the interviews for their edition. The thesis of this study will be available in UNISA's library. The findings will be communicated to the participants in an appropriate manner by means of a workshop. The

findings will also be made available electronically on request to the college, student teachers, the Ministry of Primary and Secondary Education and the Ministry of Higher and Tertiary Education, Science and Technology Development.

Yours sincerely

Mavesere Benjamin
EC No. 0042673H
Dept/Stn 2760/2400

Appendix G: Participant information sheet

30 July 2019

Title: Perceptions of primary school student teachers of the practical application of constructivism.

DEAR PROSPECTIVE PARTICIPANT

My name is MAVESERE BENJAMIN and I am doing research under the supervision of Prof Elizabeth Venter, in the Department of Psychology of Education, towards a PhD at the University of South Africa. We are inviting you to participate in a study entitled: **Perceptions of primary school student teachers of the practical application of constructivism.**

WHAT IS THE PURPOSE OF THE STUDY?

This research is expected to study primary school student teachers' perceptions of the practical application of constructivism.

WHY ARE YOU BEING INVITED TO PARTICIPATE?

You are invited because your name was randomly sampled from a list of student teachers doing teaching practice in Gweru urban area and you are conveniently positioned for the purposes of the study. You are to be to be part of the eight student teachers who will take part in this study.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves classroom observations, and semi-structured interviews. You will be observed whilst teaching and interviewed on arrangement after the lesson at a time convenient to you before schools close for the day. The interview is not expected to last more than an hour. The questions will focus on your perceptions of the practical application of constructivism.

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

Participation in this study is voluntary and you are under no obligation to consent to participation. If you decide to take part, you will be given this information sheet to keep and

be asked to sign a written consent form. You are free to withdraw at any given time and without giving a reason.

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

Findings from the study have the potential to provide new information on the practical application of constructivism. This will enhance the understanding by teacher educators and practicing teachers of what is helpful in the practical application of constructivism.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

The study involves collecting non-sensitive information from adults. Therefore, there is no foreseeable risk of any inconvenience.

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

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

In the event of having a transcriber and a coder, they will have access to the data but only with strict adherence to the research ethics of confidentiality. They will sign a confidentiality agreement. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

Your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings. Pseudonyms will be used to maintain confidentiality or anonymity in any publication of the information.

HOW WILL THE RESEARCHER PROTECT THE SECURITY OF DATA?

The researcher will store hard copies of your answers for a period of five years in a locked cupboard/filing cabinet in his office at Mkoba Teachers College for future research or academic purposes. Electronic information will be stored on a password-protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After a period of five years, hard copies of the stored data will be shredded. Electronic copies will be permanently deleted from the hard drive of the computer using a relevant software programme.

WILL I RECEIVE ANY PAYMENT FOR PARTICIPATING IN THIS STUDY?

Your participation in this study is greatly appreciated. However, you will receive no payment for your participation.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the CEDU REC, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

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

If you would like to be informed of the final research findings, please contact MAVESERE BENJAMIN on +263 772422440 or bmavesere@yahoo.co.uk or bmavesere@mkobatc.ac.zw. The findings are accessible for a period of five years. The findings of the study will be communicated to participants in an appropriate manner by means of a workshop. The findings will also be made available electronically on request.

Should you require further information or want to contact the researcher about any aspect of this study please contact Prof Elizabeth Venter on +27 124294751, or ventee1@unisa.ac.za

Should you have concerns about the way in which the research has been conducted, you may contact Prof Elizabeth Venter

Thank you for taking time to read this information sheet and for participating in this study.

Thank You

Mavesere Benjamin.

Appendix H: Consent to participate in the study

I, ..., confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recordings on audio tapes.

I have received a signed copy of the informed consent agreement.

Participant Name and Surname (Please print) .....

Appendix I: Interview guide

Main open-ended questions and possible probes

1. Do you think teachers are still prone to using traditional approaches to teaching and learning?

   What kind of approaches do you think teachers still use?

   Why do you think teachers still use traditional approaches instead of constructivism (New Approach)?

2. How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classroom?

   If you need to explain constructivism to teachers, how will you do it to make it attractive to use practically in the classroom?

3. What are your perceptions about the practical application of constructivism in teaching and learning?

   Why do you believe that constructivism is the best way to teach and learn?

   What does the practical classroom application of constructivism entail?

4. What role do you foresee for constructivism to play in teaching and learning in the classrooms in Zimbabwe?

   Why do you think it is important/or not?

   Explain the practical application thereof in the classroom.

5. What do you think should be done to enhance the appreciation of constructivism in teacher education programmes?

   Do primary school student teachers get enough training on how to apply the New Approach/constructivism practically in the classroom?

   In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Appendix J: Observation checklist

	Constructivist classroom activity	Application in the classroom	
		Participants who applied	**Participants who did not apply**
1	Decoration of walls with charts and creation of learning corners/areas		
2	Arrangement of classroom furniture to facilitate group activities		
3	Interactive and learner-centred activities		
4	Varied teaching methods		
5	Concern with aspects of learners' progress and individual differences and difficulties		
6	Supporting slow learners to catch up with others		
7	Using games and play activities to promote learning		
8	Regular use of learning aids		
9	Ensuring children's social, mental, physical, spiritual and emotional growth		
10	Whole group and small-group discussions		
11	Cooperative/Collaborative learning activities		
12	Democratic environment – learners allowed to be active and independent		
13	Discovery learning – classroom experiences that allow learners to predict and manipulate objects		
14	Learners allowed to pose questions		
15	Experimentation – learners allowed to research, investigate, imagine, invent and reason		
16	Metacognition – learners allowed to think and make use of prior knowledge to reach new understanding		
17	Mutual respect – teacher and learners interact with ease and comfort		
18	Learners affection for the teacher – learners show affection		

	Constructivist classroom activity	Application in the classroom	
		Participants who applied	**Participants who did not apply**
19	Group discussions and teacher support where necessary		
20	Teacher creativity and flexibility in the classroom to incorporate ongoing experiences		
21	Teacher in facilitation role for empowerment of learners		

Appendix K: Proof of editing

To whom it may concern

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

BENJAMIN MAVESERE

Department of Psychology of Education

University of South Africa

PhD Thesis

Perceptions of Primary School Student Teachers Regarding the Practical Application of Constructivism

Cilla Dowse
19 February 2021

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Appendix L: Interview transcriptions

PARTICIPANT A

Qn. Do you think teachers are still prone to using traditional approaches to teaching and learning?

Ans. Yes...

Qn. What kind of approaches do you think teachers still use?

Ans. Storytelling is one of them.

Qn. It is traditional or constructivist? ...the teacher will be telling the story

Ans. The teacher will be telling the story. The teacher tells them, then from the story learners can say what they think or even open up their views.

Qn. Why do you think teachers still use traditional approaches instead of constructivism?

Ans. Its mainly due to the effect that children come from homes where they are taught old approaches and when they come home they carry with them those societal norms ... and to grab their attention we should teach from the known to the unknown so we should teach them from what they already know to what they don't know.

Qn. How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classrooms? Constructivism is learner-centred education.

Ans. One of the main causes is inadequacy of media, especially in the new approach of child-centred education. Each child should learn by doing and that means if are to teach learners a certain concept, they need to touch, they need to see, they need to sense. All need to be used but considering the economy of Zimbabwe, its very difficult to find those resources. And you can even come to ICT tools. Not all teachers have to knowledge to use them, and these equipment are not available. Erratic power supplies also contribute.

Qn. If you need to explain constructivism to teachers, how will you do it to make it attractive to use practically in the classroom?

Ans. I will outline the advantages and when I outline the advantages. Maybe I will engage teachers in constructing media using the local environment so that it becomes easy. I could

also include the parents so that they can provide the media. If I have a lesson in the coming week I can ask learners to bring those media so that we work hand-in-hand with the parents which is parents.....

Qn. What are your perceptions about the practical application of constructivism in teaching and learning.. Do you see it as good or bad?

Ans. Its good because, one, it grabs learners', and secondly, it leads to them doing, it leads to memory retention, the remember what they have done than what they see or hear.

Qn. What does the practical application of constructivism entail. What does it bring about, something like cost, expenses, and so on, ease of doing business and so on?

Ans. Its very expensive, considering the inflation rate in Zimbabwe and considering what is on the ground in Zimbabwe. You can even consider the teacher-pupil ratio. It should be 1:20 according to SI 106 but on the actual ground its 1:70.

Qn. What role do you foresee for constructivism to play in teaching and learn in the classroom in Zimbabwe. Does it have a role to play?

Ans. Yes ...

Qn. Why do you think it is important or not?

Ans. Its important because it makes the learners feel being accommodated. They have a sense of ownership and once they have a sense of ownership they can do whatever they think and its easier to identify learners' talents and then nurture them. It also accommodates even learners with disabilities.

Qn. What do you think should be done to enhance the appreciation of constructivism in teacher education programmes.

Ans. I think the govt, the parents and the teachers should work together to achieve the goal. There should also be outreach programmes to teach learners on the importance of this approach so that they understand it better, because the other factor that affects it is the approach and attitude.

Qn. What do you think should be done for teachers in training so that they appreciate it?

Ans. Maybe they should be helped with adequate knowledge and skills on how to accommodate this approach in teaching and learning.

Qn. Do primary school student teachers get enough training on how to apply constructivism practically in the classroom ...

Ans. I think the time is limited ... there is not enough time ... Most of the work is done when you are in practicals ... Maybe I can say the learners will tell what is supposed to be done then you will be learning from the learners. ... because the way they answer their questions will tell you where you lack.

Qn. In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans. I think they need support. And maybe their responsibility allowance needs to be increased so that it could accommodate almost all the needs of this approach.

PARTICIPANT B

Qn. Do you think teachers are still prone or likely to using traditional approaches to teaching and learning?

Ans. Yes.

Qn. What kind of approaches do you think teachers still use?

Ans. They are teacher-centred approaches which are mostly behaviourist. The teacher stands in front of the class most of the times. The teacher is always telling the learners what to do.

Qn. Why do you think teachers still use traditional approaches instead of constructivist approaches?

Ans. I think its because they believe they know better than the learners so they are in a position to give the learners the information they require. The teacher controls everything in the room and learners are required to sit and quiet most of the time.

Qn. How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classrooms?

Ans. I think they can be convinced through more workshops.

Qn. If you need to explain constructivism how would you do it to make it attractive to use practically

in the classroom?

Ans. I would lead by example. You take a group and teach them, demonstrating the use of constructivism whilst other teachers are watching.

Qn. Does constructivism lead to greater learning and understanding?

Ans. Yes

Qn. What are your perceptions about the practical application of constructivism in teaching and learning?

Ans. I can say its very good because the learners will learn on their own. Learners must learn by themselves then the teacher acts as a facilitator.

Qn. Why do you believe that constructivism is the best way to teach and learn?

Ans. I can say that learners learn better by themselves, and they won't easily forget what they discover.

Qn. What does the practical classroom application of constructivism entail or involve?

Ans. I can say it needs more resources since the children have to use media in their learning. It also needs more time in training the teacher. The teacher will not do a lot of work during the lesson because the learners will do their work in groups, then the teacher will just be supervising.

Qn. What do you think should be to improve or enhance the appreciation of constructivism in teacher education programmes?

Ans. What should be done is to teach the student teachers the advantages of using constructivism.

Qn. Do primary school student teachers get enough training on how to apply the New Approach or constructivism practically in the classroom at college?

Ans. As far as I am concerned, yes, they get enough training at college but when they go on teaching practice, the mentors may direct them to traditional teaching. There is some sort of conflict between what is taught at college and what prevails in the schools.

Qn. In what ways can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans. I think there is need for lecturers to do workshops with the mentors first so that the mentors get to know new ideas that are coming from college.

PARTICIPANT C

Qn: Do you think teachers are still likely or prone to using traditional approaches to teaching and learning?

Ans: Yes I think so.

Qn: What kind of approaches do you think teachers still use?

Ans: I think some teachers are still using traditional approaches whilst others are using the New Approach.

Qn: Why do you think teachers still use traditional approaches instead of constructivism?

Ans: I think teachers using traditional approaches are those who have been in the teaching field for long or teachers who have been trained in using such methods. For example, in Grade One or Grade Two I entered is where I saw the old approach being applied (senior teachers are usually allocated to grades one and two).

Qn: How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classrooms?

Ans: I think maybe through retraining or workshops so that they appreciate this New Approach. what I have observed in the schools is that when they take teachers for workshops normally they prefer to take the junior teachers and leave out the senior teachers who use still use the old approach. the result is that the old teachers continue using the old approach.

Qn: If you need to explain constructivism to teachers, how would you do it to make it attractive to use practically in the classroom?

Ans: I think, maybe I can make use of ICT, like projectors, so that they appreciate the use of the New approach ..., demonstrations ..., practically and not only explaining but learning out what will be going on in a classroom situation where constructivism is being applied so that they get to appreciate because just explaining by word of mouth will not yield positive results but if they do and observe.

Qn: What are your perceptions about the practical application of constructivism in teaching and learning?

Ans: I think constructivism yields positive results. Its applicable in a classroom situation as opposed to the teacher-centred approach. learners will be involved as it is a hands-on approach. learners will gain understanding as they go on because it is connected to their way of life. Its not like at school they learn something different from that which they learn at home but it will be the same. As a result they will understand what they will be learning.

Qn: Why do you believe that constructivism is the best way to teach and learn?

Ans: I think its because it involves the learner because the teacher is not the one who is learning but the learner is the one who is learning.

Qn: What does the practical application of constructivism entail/involve?

Ans: I think it needs the teacher to be on his/her toes and be up-to-date with what is trending in education and also to be resourceful. Some might say it is expensive but I do not see it being so because a teacher can improvise. The teacher is a facilitator.

Qn: What role do you foresee for constructivism to play in teaching and learning in the classrooms in Zimbabwe?

Ans: I think it has got a future as compared to the old approach where the learners would just learn about some things not even applied in their lives but this one has got a future. Plus if we look at the syllabus we see that its easy to apply for the teachers and easy to understand for learners. Some things which are done in a lower grade come up again in a higher grade. Its like from simple to complex. The learning material is incremental but the learning material is familiar. It is something coming from their everyday lives. There is no new material coming in.

Qn: Why do you think constructivism is important?

Ans: I think its important because it benefits the learner more than the teacher since the methods are learner-centred.

Qn: explain the practical application of in the classroom. How is constructivism applied in the classroom?

Ans: I think the learners will be doing most of the activities. The teacher just demonstrates at the beginning of the lesson, then the leaves the learners to do most of the activities, such as experimentation. Learners will be doing the actual experimentation rather than being told or

shown what to do by the teacher. it is a hands-on approach where the learners do the actual experimentation with objects of their choice. Learners get first-hand information instead of being told by the teacher or observing the teacher doing the experiment.

Qn: What do you think should be done to enhance/improve the appreciation of constructivism in teacher education/training programmes?

Ans: For student teachers, I think at college we get full information but when we go for teaching practice we come across mentors who do not appreciate the idea that learners must be doing most of the activities. That is where the challenge comes in. Then the other issue is about the environment which may not be permitting. The teacher-learner ratio may be too high which makes it difficult to implement constructivist principles.

Qn: Do primary school student teacher get enough training on how to apply the New Approach or constructivism practically in the classroom at college?

Ans: At college we get enough training. For example when we do micro-teaching, we get enough exposure and we would reflect on our performance so that by the time we go for teaching practice we would be fully equipped. Plus the other issue is that we are taught to improvise whilst at college, to make media, charts and materials which are mostly learner-centred such that when we go out in the field we would be having a clear picture of how to do some things.

Qn: In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans: I think they must vary the mentors they invite for workshops. They must not invite the same mentors to come for training but all teachers must be given a chance because most teachers are still using the old approach. the other thing is that the school Heads must be particular about the application of constructivist principles when they supervise not only student teachers but for mentors teachers as well. Plus they can also organise days when all teachers at the school can observe an experienced teacher teaching using constructivist principles so that all teachers can speak with the same language on constructivism.

PARTICIPANT D

Qn. Do you think teachers are still likely or prone to using traditional approaches to teaching and learning?

Ans. Yes. They are still using traditional approaches to teaching and learning.

Qn. What kind of approaches to teaching do you think teachers still use?

Ans. They are still using approaches like the lecture method, the look and say and story-telling.

Qn. What about being teacher-centred?... most of their lessons... are they teacher-centred?

Ans. To a certain extent yes.

Qn. Why do you think teachers still use traditional approaches instead of constructivism?

Ans. I think most of the teachers use traditional approaches instead of the New Approach in the sense that sometimes they want to gain control over their learners ... to manipulate their learners anyway they like.

Qn. How do you think teachers should be convinced to use constructivism instead of traditional approaches in their classrooms?

Ans. I think teachers should be convinced to use this New Approach instead of traditional approaches in their classrooms basing on the ideas of constructivism. For example, it allows opportunity for individual cognition, a chance for inter- and intra-psychological dialogue within the learners and it follows learner's needs and interest and so basing on these ideas I think teachers should be convinced to use constructivism instead of traditional approaches.

Qn. If you need to explain constructivism to teachers, how will you do it to make it practically Attractive?

Ans. I will actually explain its advantages. For example, basing on the idea of inter- and intra-psychological, constructivism gives learners an opportunity to meet and interact either as self or as a group. For example, they can be having peer tutoring – learning from each other, learning from one level to another, while they interact either inter- or intra-psychological.

Qn. What are your perceptions about the practical application of constructivism in teaching and learning?

Ans. My opinions are that the practical application of constructivism in teaching and learning is so beneficial in the sense that it follows learners' needs and interests. Therefore teaching and learning follows the interests and needs of learners. Learning will be enjoyable and as a result the learners will participate freely as they will be enjoying learning. As we are following their needs, their interests, we are not forcing them but what we are doing, we are following their needs, what they want so learning will be enjoyable.

Qn. Why do you believe that constructivism is the best way to teach and learn?

Ans. I believe that constructivism is the best way to teach and learn because mostly it is learner-centred. The teaching and learning is not centred on the teacher but it is rather centred on the learners themselves. Therefore constructivism is the best way to teach and learn.

Qn. What does the practical classroom application of constructivism entail or involve?

Ans. It means less freedom to the teacher and more freedom to the learners.

Qn. ... what about facilitating? Does the teacher become more of a facilitator or a director.

Ans. The teacher becomes more of a facilitator of learning.

Qn. What role do you foresee for constructivism to play in teaching and learning in the classroom in Zimbabwe. Does it have a future?

Ans. Yes. In the sense that it promotes learner-centred learning approaches. For example, free-play. Learners will be able to manipulate whatever resources in the teaching and learning situation. Learners will be able to explore and discover facts for themselves and due to this constructivism, teachers can easily foretell the talent in each child and then they have the chance to mould the learners according to their talents.

Qn. Why do you think it is important or why is it not important?

Ans. I think constructivism is important because it gives learners an opportunity to actively participate during teaching and learning.

Qn. Explain the practical application of constructivism in the classroom.

Ans...... No answer.

Qn. What do you think should be done to enhance or to improve the appreciation of constructivism in teacher education programmes?

Ans. I think the teacher trainees should be taught the advantages and the implications of constructivism and they can also be encouraged to use these methods during their micro-teaching or peer-teaching.

Qn. Do primary school student teachers get enough training on how to apply the New Approach or constructivism practically in the classroom?

Ans. I think there is no enough training, basing on the period we take whilst in the college before we are deployed for teaching practice. Sometimes we will be deployed after two terms and by that time the teacher trainees are deployed some of them will not be fully equipped on what they should do to use the constructivism approach practically in their classroom. Worse still when they go for teaching practice most of the senior teachers who will be their mentors – most of them – they are still prone to using traditional approaches due to the fact that they want to manage time, most of them use traditional approaches instead of constructivism so it will be so difficult for the teacher trainees to get enough knowledge about the constructivist approach.

Qn. In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans. I think they should be encouraged to use the New Approach during their micro-teaching, during their peer teaching and also when they are deployed for teaching practice. There is need to help them during assessment. They need to be encouraged to use the constructivist approach.

PARTICIPANT E

Qn: Do you think teachers are still prone or likely to use using traditional approaches to teaching and learning?

Ans: Yes they are still prone to using traditional approaches.

Qn: What kind of approach do you think teachers still use?

Ans: Yes I think some are still using the traditional methods.

Qn: Why do you think teachers still use traditional approaches instead of constructivism or the New Approach?

Ans: I think some of the schools lake adequate resources like textbooks that teachers end up spoon-feeding the learners.

Qn: How do you think teachers could be convinced to use constructivism instead of traditional Approaches in their classrooms?

Ans: I think they can be convinced through regular workshops on the importance of constructivism.

Qn: If you need to explain constructivism to teachers how would you do it to make it attractive to use practically in the classroom?

Ans: I think through experiments

Qn: What are your perceptions or opinions about the practical application of constructivism in teaching and learning?

Ans: I think constructivism promotes critical thinking among learners because learners are not empty slates. They have got other knowledge, so as a teacher you should work as a facilitator in a way to drive them to come up with desirable results.

Qn: Why do you believe that constructivism is the best way to teach and learn?

Ans: I think it is the best way to teach and learn because it caters for individual differences like the

higher ability learners can do some of the tasks on their own whilst the teacher as a facilitator will also be helping low ability learners.

Qn: What does the practical application of constructivism entail or involve?

Ans: I think it involves "hands on" by the learners.

Qn: What role do you foresee for constructivism to play in teaching and learning in the classroom in

Zimbabwe?

Ans: I think if well fostered constructivism plays a pivotal role because learners will learn independently. Also if the learners are groomed at an early age, it helps them when they become adults or when they pursue higher education.

Qn: Why do you think it is important or is not important?

Ans: It is very important.

Qn: Explain the practical application of constructivism in the classroom.

Ans: It can be used through experiments, through games, through role play whereby learners take part and when learners take part it becomes easy for them not to forget the concepts and also through discovery learning.

Qn: What do you think should be done to enhance or to improve the appreciation of constructivism in teacher education programmes by student teachers?

Ans: I think through regular workshops or awareness campaigns.

Qn: Do primary school student teachers get enough training on how to apply the New Approach or constructivism?

Ans: Yes. Student teachers are taught how to apply constructivism but the challenge is with the schools. The mentors still have or are still attached to the traditional methods of teaching. They do not want to adapt to change.

Qn: In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans: I think by provision of adequate resources and more time from the school administration.

PARTICIPANT F

Qn: Do you think teachers are still prone to using traditional approaches to teaching and learning ?

Ans: I think teachers, some of the teachers, are still prone to using traditional approaches to teaching and learning but most of the teachers are now using other approaches.

Qn: What kind of approaches do you think teachers still use?
Ans: Answered

Qn: How have you found the use of traditional approaches to be like.
Ans: Traditional approaches are not really interesting to use. Sometimes when teaching you find that you finish doing all the work you had planned for before the lesson comes to an end. You find that you have nothing to occupy the learners for the remaining minutes and learners start doing all sorts of bad things. They start shouting at each other, throwing objects at each other and even fighting. The rest of the time you find yourself shouting "quiet", "quiet please", but they don't listen to you.

Qn: Why do you think teachers still use traditional approaches instead of constructivism?
Ans: I think some of the teachers still use traditional approaches instead of constructivism or the New Approach because some of the teachers they think learners are born empty slates so they want to impart knowledge instead of allowing learners to be active in a classroom situation.

Qn: How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classrooms?
Ans: I think teachers can be convinced to use constructivism instead of traditional approaches in their classrooms by telling them advantages of using constructivism.

Qn: If you need to explain constructivism to teachers how you do it to make it attractive to use practically in the classroom?
Ans: If I am to explain constructivism to teachers I would make an example by teaching learners using constructivist methods in a classroom situation.

Qn: What are your perceptions about the practical application of constructivism in teaching and learning?
Ans: I think all teachers must use the practical application of constructivism in teaching and learning so that learners may master better the concepts being taught. I see it as being very good.

Qn: Why do you believe that constructivism is the best way to teach and learn?
Ans: I think constructivism is the best way to teach and learn because since learners are to gain knowledge they must be involved so they will be critical thinkers in teaching and learning.

Qn: What does the practical application of constructivism entail or involve?
Ans: The practical classroom application of constructivism involves the hands-on approach. It involves the use of experiments or experiences whereby the learners are more actively involved.

Qn: What do you foresee for constructivism to play in teaching and learning in the classrooms in Zimbabwe?

Ans: I think constructivism plays a very crucial or important role in the teaching and learning in the classroom in Zimbabwe?

Qn: Explain the practical application of constructivism in the classroom.
Ans: The practical application of constructivism is whereby the teacher introduces a certain concept and then allows learners to participate more whereby the teacher will be acting as a guide or facilitator but learners are more actively involved.

Qn: What do you think should be done to enhance or to improve the appreciation of constructivism in teacher education programmes by the student teachers?
Ans: I think mentors must act as role models by teaching using constructivism or child-centred methods so that the student teachers would imitate what is being done by the mentors.

Qn: Do primary school student teachers get enough training on how to apply the New Approach or constructivism practically in the classroom?
Ans: I think student teachers get enough training on how to apply the New approach or constructivism practically in the classroom?

Qn: In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?
Ans: I think primary school student teachers can be assisted to apply constructivist principles in their practical teaching in a number of ways. For example, qualified teachers may give student teachers examples of how to apply constructivist principles then they may also tell them the advantages compared to the traditional approaches which are now outdated. Mentors can play as role models and then give the student teachers the advantages of using the New Approach.

PARTICIPANT G

Qn: Do you think teachers are still prone to using traditional approaches to teaching and learning.

Ans: Yes. Qualified teachers usually use traditional approaches.

Qn: What kind of approaches do you think teachers still use?

Ans: Traditional approaches.

Qn: Why do you think teachers still use traditional approaches instead of constructivism or the New Approach?

Ans: I think they are the ones who have the information. they know better than the learners so that they have to give the learners information. they are there just to give the learners information. what the learners don't know is what they just tell them. They are the ones who know better than the learners so they just have to give the learners information. what they teach they reinforce and the learners is going to understand.

Qn: How do you think teachers could be convinced to use constructivism instead of traditional approaches?

Ans: Maybe doing workshops with the teachers and encouraging them to use constructivism and telling them that learners are not blank slates.

Qn: If you need to explain constructivism to teachers, how would you do it to make it attractive to use practically in the classroom?
Ans: Explaining to teachers about constructivism.

Qn: What are your perceptions or opinions about the practical application of constructivism in teaching and learning?
Ans: I think constructivism is a good method of teaching learners because the learners just need to discover something on their own. That is the best way of learning.

Qn: What does the practical classroom application of constructivism entail or involve?
Ans: Constructivism may be time consuming on one side since every learner must discover. Of course they are discovering the same information but it may take time for slow learners to understand or to gather information on that they are supposed to learn.

Qn: What role do you foresee for constructivism to play in teaching and learning in Zimbabwe?
Ans: Constructivism can equip the learners with creative skills to do things on their own in life. When learners become creative they can do something that has not been done in Zimbabwe.

Qn: Why do you think it is important or not important?
Ans: .....No answer

Qn: Explain the practical application of constructivism in the classroom.
Ans: .....No answer

Qn: what do you think should be done to enhance or to improve the appreciation of constructivism in teacher education programmes?
Ans:.....No answer

Ans: When they are learning that approach must be used so that they can see it on their own, the value of constructivism.

Qn: Do primary school student teachers get enough training on how to apply the New Approach or constructivism?
Ans: To a larger extent yes. It depends with the mentor. Some mentors give them time to do it. Some mentors decline saying they know better than the student teacher so they teach those subjects which are cheaper and in those subjects the teacher uses traditional methods. Lecturers also explain in the classroom.

Qn: In what ways can primary school student teachers be assisted to apply constructivist principles in their practical teaching?
Ans: In their first year when they are doing micro-teaching that is the best time to make sure that they use the constructivist approach for teaching. When they go to the schools they then use constructivism to teach. Lecturers must make sure that when they go out student teachers are using constructivist principles. When they fail they must repeat until they master.

PARTICIPANT H

Qn: Do you think teachers are still prone or likely to use traditional approaches to teaching and learning?

Ans: Yes teachers are still prone to using traditional approaches to teaching and learning?

Qn: What kind of approaches do you think teachers still use?

Ans: They use the traditional approaches.

Qn: Have you tried to use traditional approaches in your teaching?

Ans: Yes

Qn: How did you find them to be?

Ans: The teacher does most of the work but this is not an interesting way to teach. Learners quickly lose interest in what you are saying. They start to talk to each other when you are busy explaining something. Others start dozing or fighting each other.

Qn: Why do you think teachers still sue traditional approaches instead of constructivism or the New Approach?

Ans: I think it is because when they trained they were taught to use the traditional approaches.

Qn: Do you think they have information on constructivism?

Ans: Yes they have. Sometimes, maybe they learn from the student teachers who are still coming from college but then it is difficult for them to use the New Approach since they are used to traditional approaches.

Qn: How do you think teachers could be convinced to use constructivism instead of traditional approaches in their classrooms?

Ans: I think they can be convinced to use constructivism instead of traditional approaches by explaining to them about the advantages of learner-centred methods.

Qn: If you need to explain constructivism to teachers how will you do it to make it attractive to use practically in the classroom?

Ans: I think by demonstrating the use of the learner-centred approach so that they can see its advantages as well as by means of workshops.

Qn: What are your perceptions or opinions about the practical application of constructivism in teaching and learning?

Ans: I like the practical application of constructivism. I think it is a very good approach.

Qn: Why do you believe constructivism is the best way to teach and learn?

Ans: It enables learners to think and learn on their own. It also enables learners to learn from each

other. The teachers can also get a chance to learn from the learners.

Qn: What does the practical classroom application of constructivism entail or involve?

Ans: I involves groupwork, discussions done by learners whereby the teacher will only be working as a facilitator.

Qn: What role do you foresee for constructivism to play in teaching and learning in the classroom in Zimbabwe?

Ans: It plays a very big role in the teaching and learning. I think it increases memory retention. It is very rare for learners to forget what they will have mastered on their own?

Qn: Why do you think it is important or not so important?

Ans: (Answered already)

Qn: Explain the practical application of constructivism in the classroom.

Ans: It is a learner-centred approach. the teacher plays the role of a facilitator whereby she will only get to correct where the learners would have gone wrong and on the other hand learners will learn on their own.

Qn: What do you think should be done to enhance or to improve the application of constructivism in teacher education programmes?

Ans: I think teachers who are already in the field have to be educated on the advantages of the New Approach.

Qn: Do primary school student teachers get enough training on how to apply the New Approach or constructivism?

Ans: Yes they do because when they go to college they are taught to teach using the New Approach.

Qn: In what way can primary school student teachers be assisted to apply constructivist principles in their practical teaching?

Ans: I think they can be assisted by their mentors and headmasters through encouraging them to practice using the New Approach as well as mentoring them on how to use the approach so that they get to see the advantages or effects of using the New approach. at college the lectures have to continue encouraging students so that they use the New Approach when they go on teaching practice.

Appendix M: Criteria and indicators for assessment of practical teaching

UNIVERSITY OF ZIMBABWE

DEPARTMENT OF TEACHER EDUCATION

CRITERIA AND INDICATORS FOR THE ASSESSMENT OF PRACTICAL TEACHING

Descriptors/ Category	Percentage Range	Criteria	Indicators
Distinction or Excellent [1st]	80+	The exceptional teacher with **distinctive sensitivity towards children and their learning;**	Highly motivated, accommodates and builds on individual pupils' experiences and learning styles, creates opportunities for independent learning leading to pupils constructing knowledge. Employs a range of motivating teaching strategies that suit different learners' styles. Attends to individual learners, sensitive in handling unexpected events. Active use of actual learners' contributions. Elicits and develops learners' ideas and experiences. An outstanding teacher who exhibits excellent perception of the link between schemes, plans and records of work, who caters for distinctive and special needs of the different learners through careful formulation of objectives, selection of strategies, strategic deployment and execution of educational media and technology.
		Planning and activities reveal a responsiveness of and **adaptability to children's learning needs;**	Sets challenging activities and tasks that contribute to the realization of set objectives. Ability to respond to the various things that are going on in the classroom. Examples of changing plans and strategies in response to evaluations. Highly skilful in eliciting questions from pupils. Evaluations demonstrate reflective responses to varied needs of pupils. Creates learning atmosphere of curiosity, enthusiasm and mutual support. Planning shows anticipation of problems to be encountered and suggests possible alternatives and solutions. Designs activities which cater for individual differences in terms of learning styles, ability and interest. Links learning activities to real life situations, uses children's experiences as a spring board to learning and further exploration of knowledge, uses problem solving tasks. Uses collaborative learning which promotes individual accountability. Evaluation of lessons is reflective and shows evidence of progressive development of personal skills. Teacher plans for different abilities of individual learners. Unquestionable evidence of thorough preparation that goes beyond the classroom e.g. reflective evaluations made on strengths, weaknesses and observations noted. Imaginative improvisation and use of teaching/ learning educational media and technology for individual needs.
		Subject mastery extends to processing of tasks and concepts which includes **learner perspectives;**	Does clear content and concept analysis. Spells out the skills, concepts to be acquired (mastered) and show how they are to be assessed. Extends pupils' knowledge, skills, concepts and attitudes. Creates fertile ground for applying knowledge, skills and concepts. Displays imaginative integration of concepts from different subject areas. Creates a conducive

			environment which allows/ promotes transfer of knowledge/ skills. Allows pupils to create knowledge/ skills on their own.
Descriptors/ Category	**Percentage Range**	**Criteria**	**Indicators**
Merit or Very Good [2.1]	70-79	**Capable manager of the learning programme,** the learning environment and of children;	Teacher able toorganise manageable groups which are meaningful; varied learning tasks for different groups. Planning caters for group differences; very good rapport between the teacher and the pupils; effective pupil to pupil interaction. Evaluations show a clear analysis of pupils' strengths, remedial and extension work; there is insightful self-evaluation.
		Children learn in a variety of ways through a variety of activities;	Varied educational media and technology relevant, appropriate and varied. Lesson plans show substantial involvement of pupils in the learning process. Substantial quantity and quality of pupils' work; meticulous marking with meaningful comments. Uses motivating introduction. Lesson development shows a logical and variety of learner centred activities. Varied and well focused questions. Impressive manipulation of varied educational media and technology.
		Activities designed for the active processing of concepts. Impressive conceptual understanding.	Subject matter applied to everyday life. Logical link between schemes, plans and records. Observable development of concepts and skills in the learners. More thought-provoking explanations and illustrations.
Sound Pass or Good [2.2]	**60-69**	**Competent teacher/ instructor; most children are learning** most of the material;	Rapport between the teacher and pupils; effective pupil to pupil interaction. There is a wide scope of referencing; there is reflective and detailed evaluation of self, learner and content.
		Purposeful organization of learning/ teaching programme; children and their work are well-controlled and orderly;	Lesson plans are subject specific, indicate greater subject mastery – content wise and lesson plans show resourcefulness. Pupils' work is constructively marked and recorded. Lesson presented shows logical flow of activities from introduction to conclusion; introduction is motivating and closely linked to the lesson. Well focused and appropriate teaching strategies used by the teacher, effective learning activities take place.
		Clear explanations and illustrations of new concepts.	Teacher uses clear and effective explanations. There is effective use of educational media and technology.

Descriptors/ Category	Percentage Range	Criteria	Indicators
Pass or Satisfactory [3rd]	**50-59**	**Satisfactory teacher; Adequate** display of base-line teaching skills. Learning environment, materials and children are **sufficiently organized** for learning to take place;	Manages class appropriately; gives purposeful and effective directions; organized spaces and materials e.g. charts. Teacher uses relevant introductions and conclusions; orderly behavior by pupils; comfortable and happy looking children. Timely arrangement of tasks. Organising and managing learning in groups, proper target setting; monitoring and follow-up on group products. Children's work displays – adequate amount and range.
		Concepts are **adequately** explained;	Teacher's use of verbal explanation, media, illustrations, chalkboard and pupils' work appropriate. Acceptable verbal responses, written responses and other products from learners. Asks focused and relevant questions.
		Planning and documentation is up-to-date and adequate.	**Schemes** organized in all components:- general aims, week ending dates topics, activities, methods, media and descriptive evaluations. Lesson plans show clear objectives and breakdown of content, source of materials, educational media and technology, activities, meaningful and up-to-date evaluation. Progress records available, regularly attended to with a basic link between schemes, plans and pupils' books.
Repeat or Weak	**40-49**	Some **indications of potential forimprovement** but further practice is required;	Teacher has potential to improve but develops skeletal schemes and lesson plans – needing additional detail, skeletal progress records and remedial records. Weak communication strategies; inadequate monitoring of children's learning and feedback not clearly focused (e.g. can do better).
		Display of **children's learning issporadic**; not consistent;	Sporadic learning indicated by infrequent setting and marking of pupils' work. Partial planning, objectives lack clear focus and scanty evaluations. Sparse attention to progress and remedial records.
		Insecure grasp of subject matter and concepts.	Weak mastery and lacks confidence of subject matter. Partial grasp of content frequently exhibited schemes, lesson plans and teaching.
		Documentation tends to be **incomplete or lacking in coherent purpose.**	Lack of coherence in planning and content; inefficient use of educational media and technology.

Descriptors/ Category	Percentage Range	Criteria	Indicators
Fail or Unsatisfactory	**0-39**	There is **inadequate evidence that children are learning**	**Teacher lacks potential**; objectives do not communicate learning outcomes. Activities and tasks not linked to objectives. Learners not actively engaged in purposeful learning; poor pacing (lack of flow in the lesson); complete breakdown in communication between teacher and learners; complete insensitivity to children's learning needs e.g. sticks to lesson plan and ignores everything else.
		Lack of teaching skills and lack of organizational control over children and activities is such that **little or no learning is taking place;**	**Irrelevant and ineffective** introduction. Erratic provision of both oral and written feedback. Uses unnecessary group activities. Uncontrolled noise. Inappropriate and negative coping strategies e.g. ridiculing, insulting etc.
		Candidate **unsuited for a career in teaching;**	Abuses pupils; Alcohol and drug **abusee**.g. drunken behavior, use of corporal punishment, unauthorized absenteeism, runs away from assessors, cheating. Improper association with children; disregard of authority.
		Inadequate planning and documentation;	Teaching without lesson plans; erratic, sketchy documents; failing to maintain children's progress records; not marking children's work; failing to maintain a safe learning environment. Does not have/ use relevant media and technology.
		Inadequate grasp of subject matter and concepts.	Teaching inaccurate content and concepts; lacks content mastery.