AN EXPLORATION OF TEACHERS' PERSPECTIVES OF TEACHING AGRICULTURAL SCIENCES IN SECONDARY SCHOOLS IN TWO DISTRICTS OF KWAZULU-NATAL

By

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Declaration of authenticity

I, Nonhlanhla Fortunate Nduku, declare that the research reported in this thesis is my original work. This research has neither been presented nor accepted for any degree at any other university. I have indicated and acknowledged all sources referred to or quoted in this thesis accordingly.

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***Supported and signed by Supervisor*: Prof S.B. Khoza**

DEDICATION

I dedicate this study to my loving husband Mondli, my sons, Bandile and Simamisa, and my daughter Zanempilo for their unwavering love and support throughout this journey, *"INKOSI INIBUSISE"* and to God that I serve who has imbued me with immense wisdom, strength, and perseverance throughout this study.

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ABSTRACT

This thesis bestows the action research, which involves six teachers who participated in exploring teachers' perspectives of teaching AGRIS in secondary schools in two districts of KwaZulu-Natal. The agricultural sciences (AGRIS) South African Curriculum Assessment Policy Statement (CAPS) document stipulates that teachers should base their teaching of AGRIS on capacitating learners with adequate knowledge, skills, and values/attitudes, irrespective of their status. Therefore, the teachers' responsibility is to ensure that their teaching addresses all three aspects of teaching (knowledge, skills, and values), driven by the prescriptive, communal, and habitual perspectives. Thus, this study explores teachers' perspectives of teaching agricultural sciences in secondary schools in two districts of KwaZulu-Natal.

This research opted for a critical paradigm as well as a qualitative approach. Consequently, reflective activity, one-on-one semi-structured interviews, classroom observations, and focus group discussions were employed for data production to ensure the triangulation during the exploration of teachers' perspectives. Purposive and convenience samplings were utilised in choosing six teachers, as I required teachers with whom I was familiar, and who were available and accessible. The study employed thematic analysis to analyse produced data using inductive and deductive reasoning procedures. Trustworthiness was considered in this study by involving issues of dependability, confirmability, credibility, and transferability. In addition, issues like consent letters, anonymity, withdrawals, beneficence, and others were considered.

Moreover, three research questions guided this study, namely: 1. What are the teachers' perspectives of teaching Agricultural Sciences in schools? 2. How do teachers apply perspectives in teaching Agricultural Sciences in schools? 3. Why do teachers have particular perspectives of teaching Agricultural Sciences in schools? Consequently, the following research objectives informed the research questions and were as follows: 1. Explore teachers' perspectives of teaching Agricultural Sciences in schools; 2. Understand how teachers apply perspectives in teaching Agricultural Sciences in schools, and 3. Explore

the reasons for teachers having particular perspectives of teaching Agricultural Sciences in schools. As a result, the research questions guided the study to review the literature on principles rooted in three perspectives: prescriptive, communal, and habitual. For this reason, the study opted for Cultural, Historical Theory (CHAT), which then yielded to the evolution of new theory. Thus, the theory emerged from this study and combined prescriptive, communal, and habitual perspectives, and called PCHP.

The findings showed that not all three perspectives (prescriptive, communal, and habitual) drive teachers when teaching AGRIS in secondary schools. The study confirmed that teachers were teaching under the influence of prescriptive perspective rather than communal and habitual. They based their teaching on stipulated policies, documents, and textbooks to ensure that learners pass examinations. This implies that in South Africa, AGRIS teaching addresses the subject needs rather than teachers and society/learner needs. Consequently, this led to an unbalanced curriculum and had a negative impact on producing globally competent individuals. Therefore, this study recommends the balance AGRIS curriculum grounded by prescriptive, communal, and habitual perspectives. This curriculum will address the subject, society/learner, and teacher needs. In addition, this study recommends various research in AGRIS teaching, including the enactment of indigenous and teacher knowledge in secondary schools.

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CHAPTER ONE

REPRESENTING THE FOUNDATION FOR EXPLORING AGRIS TEACHERS' PERSPECTIVES

1.1 Student Statement

This statement presents the fundamental aspects of how I have grown personally, socially, and professionally. This substantial growth has compelled me to undertake a study of this calibre, in unearthing my capabilities and contributing to society. Mostly, this venture has imbued me with a passion for in-depth discernment of any curriculum. My journey has provided for enormous development, which has made me realise that, in life, one has to discern the world from a particular dimension to solve problems within it. Nonetheless, let me reflect on my experiences as both an undergraduate and a postgraduate student, revealing how studying has introduced me to new opportunities of comprehending curriculum aspects.

Apart from being an Agricultural Sciences teacher, my initial development was positively impacted by contextual studies while on an Adult Based Education and Training (ABET) course. This course provided me with an intense understanding of learners' status and their varied backgrounds. I studied Educational Technology in Education, which presented the importance of integrating technology into my teaching. Consequently, I am an agricultural sciences expert/content expert and an advisor and coach to my learners. These experiences persuaded me to register for a Master's degree in Education. I then realised the pivotal role of responsiveness to learners' content, social, and personal/habitual needs. Such a response imparted multiple values to me, and taught me several aspects of education and research. Today, I understand that I should base my teaching on a personal, social, and professional rationale. Nevertheless, this degree brought an in-depth understanding that Agricultural Sciences (AGRIS) is driven by a prescribed/performance/planned curriculum. As a result, I have to implement such by following set policies and formal documentation. I must incorporate the curriculum signals as they appear in the curricular spider web by van Der Akker (2009).

However, understanding the above was never enough, which is why I undertook this PhD study. My main aim was to obtain more profound knowledge of philosophical underpinnings and literature framing South African education and curriculum studies. This degree assisted me in understanding my identity, including my strengths and weaknesses. It also made me realise that society revolves around the 'what' (prescriptive perspective), the 'how' (communal perspective), and the 'why' (habitual perspective). I understand why individuals work the way they do and why they write in a particular manner. This degree further capacitated me with social skills to address society's needs and those of my colleagues. This capacitation encouraged my colleagues to transform and improve their practice. Nevertheless, a PhD serves as an eye-opener: I now view things differently. I can identify gaps professionally and otherwise, being capacitated with distinctive strategies to bridge former gaps.

1.2 Introduction

The chapter provides a synopsis of the study, which embeds teachers' perspectives. The title is based on exploring teachers' perspectives of teaching agricultural sciences in secondary schools in two districts within KwaZulu-Natal. This chapter provides an outline of how this study unfolds. It elaborates on the focus of the study: that prescriptive, communal, and habitual perspectives drive the rationale for conducting this study. This chapter also provides the background/motivation, followed by a brief description of the literature and how the findings may contribute to the body of knowledge. The chapter then proceeds to the objectives of the study, as well as the critical research questions. Subsequently, there is a brief discussion of the research design and methodology and the study's limitations. This chapter ends with a summary of the study chapters, bringing in-depth discernment to readers.

1.3 The Title of the Study

An exploration of teachers' perspectives of teaching agricultural sciences in secondary schools in two districts of KwaZulu-Natal.

1.4 The Purpose of the Study

The agricultural sciences (AGRIS) South African Curriculum Assessment and Policy Statement (CAPS) document stipulates that teachers should base their teaching of AGRIS on capacitating learners with adequate knowledge, skills, and values/attitudes, irrespective of their status. Therefore, the teachers' responsibility is to ensure that their teaching addresses all three aspects of teaching (knowledge, skills, and values), driven by the prescriptive, communal, and habitual perspectives. Thus, this study explores teachers' perspectives of teaching agricultural sciences in secondary schools in two districts of KwaZulu-Natal.

1.5 Delimitation of the Study

The study was conducted in the two districts around Durban, KwaZulu-Natal. One district is in a semi-rural area, and the other is in an urban area. The one in the semi-rural area is dominated by low socio-economic status. At the same time, the one in an urban settlement has a mixed population from low to medium socio-economic status. All schools in both districts are Quintile 3 (no-fee schools). The government provides schools with stationery and affords a feeding scheme. Most learners from these districts come from communities engulfed by poverty: they are vulnerable people with HIV/AIDS, or orphans; and some are the heads of their families. In both districts, agricultural sciences is offered from Grades 10 – 12. The schools are not close to one another because agricultural sciences is not offered in most schools.

1.6 The Study Rationale

I have been observing that the teaching of AGRIS in South Africa embeds a powerful inculcation of knowledge. On the one hand, studies conducted by Fomunyan (2014b, 2017) and Khoza (2015a, 2015b, 2016a, 2016b) on curriculum issues indicate that any curriculum is declared balanced if it inculcates knowledge, skills, and values. This balance is attainable by intertwining performance-based (knowledge), competency-based (skills), and pragmatic-based (values) curricula. On the other hand, studies conducted by Khoza (2017, 2017b, 2018, 2019a), and Khoza and Biyela (2020), emphasise that a performance curriculum addresses

the subject needs; competency-based relates to social/learner needs; and the pragmatic focuses on teacher needs. I thus interrogate the perspectives of those who are curriculum implementers (teachers) − a perspective being a way of viewing a curriculum that is based on individual experiences (personal, social, and professional) (Crotty, 1998). Thus, in this study, I have categorised perspective under three types, namely: prescriptive, communal, and habitual perspectives, as an intervention technique to improve the AGRIS curriculum.

The AGRIS curriculum is broad: thus, the Department of Education has conducted several content workshops to improve the practice. Nevertheless, teachers seem to lack self-confidence and enthusiasm (Bantwini, 2015; Khoza, 2015b) in teaching the subject; their ideology is not coinciding with their performance. The AGRIS teachers are unaware of factors that underpin their practice − poor teacher preparation, poor teaching strategies, and lack of exposure to various agricultural experiences (Camilus, 2011; Ige, Busari, & Ojo, 2016a; Modebelu & Duvie, 2012). Teachers should be acquainted with all factors that drive the teaching of AGRIS. A study was conducted by Chauke and Kabiti (2016) on teachers' perceptions of the development of AGRIS content. Teachers indicated that curriculum developers and relevant stakeholders should review the Grade 10-12 South African AGRIS curriculum. This suggests that there is an urgent need for exploring teachers' perspectives. Such may assist teachers in overcoming their challenges, addressing their needs and the needs of the subject and society/learner. Thus, the effective implementation and enactment of those perspectives may transform AGRIS teachers and improve their practice.

According to the literature, prescriptive, communal, and habitual perspectives should drive AGRIS teaching (Fomunyan, 2014, 2017; Khoza, 2015a, 2015b, 2016a, 2016b, 2017a, 2017b, 2018, 2019; Mpungose, 2018, 2020a, 2020b; Khoza & Biyela, 2020). The prescriptive perspective places the content and vertical knowledge at the centre of teaching to enlarge learners' cognitive domain (Beinstein, 2000; Bernstein, 1999; Khoza, 2017, 2017b, 2019a; Khoza & Biyela, 2020). The communal perspective places the society/learner and horizontal knowledge at the centre of teaching to develop learners' psychomotor domain (Berkvens, van den Akker, & Brugman, 2014; Bernstein, 1999; Le Grange, 2016; Mpungose, 2020c). The habitual perspective sets teacher experiences and diagonal knowledge at the centre of teaching to enhance learners' affective domain (Czerniewicz &

Brown, 2014; Khoza & Biyela, 2020; Le Grange, 2016; Mpungose, 2020a, 2020b; Waghid & David, 2016). Teachers should know and understand the perspectives of teaching AGRIS, and principles that drive each perspective, to improve their practice and bridge the AGRIS curriculum gap. In South African research, very few studies have been conducted on AGRIS. This study on teachers' perspectives of teaching AGRIS may bridge the gap within the curriculum and contribute significantly to the body of knowledge.

1.7 The Motivation for and Background to the Study

My interest in agricultural sciences, the in-depth knowledge acquired during my previous study, and my prolific experience as an agricultural sciences educator, my roles as a senior marker, deputy chief marker, and chief marker for agricultural sciences Grade 12 final examinations have provided the impetus to undertake this study. During my Master's degree programme, I discovered that teachers have distinct challenges in implementing and enacting the agricultural sciences curriculum. Nkohla (2017) conducted a study to explore teachers' reflections on their practice of agricultural sciences as set out in the CAPS. The researcher concluded that teachers are unaware of the factors that underpin their practice. This suggests that teachers' challenges may emerge from this conclusion. I have also discovered that teachers lack the understanding that social/habitual dimensions also propel their teaching of the subject. This lack of understanding was detected through their responses, which were based only on their qualifications. Such a situation may bring deficits to the curriculum implementation since curriculum developers are being silent about fundamental issues in the CAPS document. Thus, the above-mentioned predicaments led me to focus on the teaching of agricultural sciences. I am now eager to explore teachers' perspectives of teaching agricultural sciences in schools.

During workshops and marking sessions, teachers lament that their interests, endeavours, and dedication do not coincide with their performance. They are unsure what to implement or enact in order to escalate the subject level. They also lament the broader content scope (prescriptive perspective), which lacks integration into all grades. Teachers believe that this may cause a lack of subject improvement (habitual perspective) and development (communal perspective). Teachers believe that their exclusiveness during curriculum

development may also be a contributory factor. Lack of development and improvement is attested to by the Department of Basic Education diagnostic report of the November 2018 NSC examinations. This report states that the number of candidates writing the agricultural sciences examination declined from 2016 by 7932. In 2017, it continued to decrease by 3231. In 2018, the number of schools offering AGRIS slightly decreased. Over and above, there has been a gradual decline in overall results from 2014 to 2017. The number of learners studying agricultural sciences is decreasing in line with the number of schools not offering the subject. The DBE has in the past invited teachers to attend workshops assisting them to understand their practice as driven by a prescriptive perspective. Therefore, this study may bring in-depth discernment on teachers' perspectives of teaching agricultural sciences. Those perspectives may encourage curriculum developers to review the CAPS agricultural sciences document and the assessment policy statement (APS).

Studies by Khoza (2015b), Taole (2015), Bantwini (2015), and Nkohla (2017) recognise the pivotal role played by educators in the transformation of any education system. When Fomunyan (2014b) explores the curriculum's relation to social, personal, and political dimensions of schooling, he concludes that personal, social, and political components influence any curriculum. Therefore, any curriculum should intertwine prescriptive, communal, and habitual perspectives. Combining all three perspectives may ensure that learners obtain adequate knowledge, skills, and attitudes/values during the teaching process. However, curriculum developers have ignored or restricted habitual and communal perspectives during the formation of curriculum policies (Khoza, 2015a, 2015b, 2016a, 2016b; Le Grange, 2016; Waghid & David, 2016). This account is evident in the study conducted by Nkohla (2017) on exploring teachers' reflections on their practices of agricultural sciences as given in the CAPS. Four teachers from the uMkhanyakude district were participants. Reflective activity, one-on-one semi-structured interviews, and focus groups were data-production methods. The study concluded that teachers are unaware of the factors that underpin their teaching practices. Nkohla (2017) recommended that curriculum developers should involve teachers in reviewing the CAPS, as they are primary implementers of any curriculum. Even Khoza's (2015b) conclusion concurs with the results obtained by Nkohla (2017). The results further suggest that lack of knowledge of theories that underpin the CAPS results in various challenges, including lack of self-realisation and enthusiasm for effective teaching and learning.

The above signifies that teachers' perspectives on curriculum practices have been neglected, although they are fundamental to any curriculum developer's intentions. Bantwini (2015) likewise confirmed that teachers are still experiencing challenges with the curriculum. The researcher investigated whether the district's continued professional development adequately prepared teachers in the Eastern Cape Province for their classroom practice. Bantwini (2015) concluded that science teachers are experiencing challenges owing to insufficient content knowledge, pedagogical knowledge, and social knowledge. Exploring teachers' perspectives of teaching agricultural sciences in schools may enlighten/illuminate teachers, subject specialists, and curriculum developers on improving quality standards and transforming the curriculum, while executing sustainable curriculum implementation and enactment. Local studies are silent (affording a gap) about how agricultural sciences teachers should impart standardised knowledge, skills, and attitudes to learners in their classroom practice. I have not come across studies that address challenges or problems encountered by agricultural sciences teachers in their classroom practice. The study at hand may bridge this gap by bringing in factors that underpin agricultural sciences, grounded by prescriptive, communal, and habitual perspectives.

In addition, Duncan, Ricketts, Peake, and Uesseler (2006) and Tyson, Lambert, and McKim (2014) emphasise teachers' support in developing pedagogical skills to help them motivate learners to learn and escalate their critical and creative thinking. The above scholars elaborated by arguing that learners, teachers, and curricula had changed, therefore the prescribed content must be reviewed. Apart from this, they share the same belief that intense professional development in their countries (Georgia & Oregon) has had a positive impact on developing agriculture teachers' effectiveness. Duncan et al. (2006) and Tyson et al. (2014) further agree that teachers' problems and challenges cannot be resolved while ignoring content, personal, and workplace environment development. This indicates that agricultural sciences facilitators have to base teachers' professional development on content, critical thinking, and community needs aspects, to balance the priorities of curriculum developers.

Blackburn, Robinson, and Field (2015) aver that the workforce demands learners well-versed in their subject matter, learning experiences, and crucial skills relevant to the job

market. Therefore, learners should attain optimal instructional proficiency. This suggests that teachers have to be ready to endow pertinent content, learning experiences, and practical knowledge through the manifestation of content, societal, and personal strategies. Herein lies a gap in the local literature: I have not found studies that investigated or examined professional development agricultural sciences teachers' need for proper implementation and enactment of their practice. Moreover, the existing literature in agricultural sciences teaching is scarce, unlike that of industrial agriculture. Thus, this study may enhance AGRIS teachers' perspectives on problem areas that need improvement. Thus, appropriate and relevant professional development programmes for agricultural sciences teachers may be identified by referring to those perspectives.

The exploration of teachers' perspectives may assist curriculum developers in developing the subject effectively, invigorating it, and improving the pedagogy. The results of this proposed study may enlighten curriculum developers and subject specialists on the need to review the content taught in respective grades, to benefit teachers and learners. Agricultural sciences teachers may also benefit by developing greater confidence in the subject. The proposed study may improve agricultural sciences' teaching practice, providing a quality teaching and learning process in the agricultural sciences CAPS curriculum. This proposed study may benefit teachers, offering diverse perspectives. Such perspectives may explicate teaching and learning of agricultural sciences in schools, advancing learning and knowledge, and preparing students for life-long learning.

1.8 Literature Review

International scholars like Sandoval (2005), Kiemer, Groschner, Pehmer, and Seidel (2015), and Pourdavood (2016) agree that the greatest emerging concern in the education community is that of learners' inability to think conceptually about sciences and mathematics content. Hence, pragmatic conceptions (attitude/values) in any discipline are crucial outcomes of the educational process (Kiemer et al., 2015). In the same light, Sandoval (2005), Sulaiman and Rahim (2006), Ireland, Watters, Brownlee, and Lupton (2014), and Garner, Siol, and Eilks (2015b) concur that teachers' epistemological beliefs enhance better discernment of professional science. The above-mentioned researchers believe that those epistemologies can teach learners to be scientifically knowledgeable citizens by growing their scientific

literacy and improving their attitude to and motivation for the sciences and mathematics. This suggests that AGRIS teachers have to be decisive in motivating learning to provide commendatory learning outcomes from learners' interests and self-determination. The studies provide the pivotal role of pragmatic perspectives in the teaching of scientific and mathematical aspects. However, they do not provide the pedagogical knowledge that science and mathematics teachers might employ to inculcate attitudes/values. This study may elicit distinctive perspectives to enlighten curriculum developers when reviewing the agricultural sciences curriculum.

Furthermore, learners perceive chemistry as complicated and challenging to learn and unrelated to their real world (King, 2012); its focus is on inculcation of abstract, conceptual knowledge, neglecting societal and personal concepts (De Jong, 2008; King, 2012). Thus, the subject of chemistry should embrace learners' real-life chemistry interaction: teachers should teach chemical concepts on a 'need-to-know' basis (King, 2012). Abrami et al. (2015), Kiemer et al. (2015), and Nezami, Asgari, and Dinarvand (2013) state that, apart from reading and writing, the development of learners' critical thinking is vital: curriculum reform and subject matter instruction should therefore support such. This suggests that agricultural sciences teachers may manipulate chemistry understanding by incorporating their experiences originating from their contexts to fulfil curriculum developers' intentions. However, teachers require deep understanding and assistance on the enactment of their experiences in chemistry teaching. In addition, when teachers develop learners' critical thinking, they augment learners' attitudes and values apropos of the subject. The existing literature provides forms of teaching that teachers can use to manipulate learners' discernment of chemistry; however, literature is silent about the approaches teacher might employ to teach context-based chemistry and critical thinking. The study at hand may bridge this gap: it intends to portray why teachers use particular perspectives to teach agricultural sciences in schools.

On the other hand, international scholars such as McAlpine, Eriks-Brophy, and Crago (1996), Gates (2006), and others proclaim that mathematics and sciences are not a presentation pedagogy; instead, these subjects are a social construct constituted by social forces and social needs. Therefore, the teaching of such subjects should not be set for the

individual but should be offered within cooperative and social dimensions, whereby interaction and human activity occur. This concern propelled Pourdavood (2016) to conduct a study examining teachers' views on teaching and learning of the sciences and mathematics in historical and cultural contexts. The study concluded that incorporating historical and cultural knowledge on teaching and learning makes for a better discernment of scientific concepts in learners. Therefore, AGRIS teachers should not enter the classroom lacking social and political rationale, since social knowledge stimulates the understanding of professional knowledge. AGRIS teachers should be acquainted with all the dimensions of the society they are servicing.

The above is in line with articulations by Cronje, de Beer, and Ankiewics (2015), Mothwa (2011), Webb (2013), and others regarding indigenous knowledge (IK). These authors propose that IK has nothing to do with a profession or content knowledge. IK acknowledges socially constructed knowledge, which elicits scientific knowledge (SK). However, studies that have been conducted reflect that science teachers are experiencing challenges in incorporating IK into their practice. In addition to this, they claim that teachers possess limited contextual knowledge of any distinctive cultural milieu in South Africa. Even in AGRIS, teachers are experiencing challenges integrating IK with SK. Textbook content is contrary to what learners know from their environment. Learners apply practical knowledge from real-life situations; hence what textbooks contain is unfamiliar and complicated. This suggests that teachers should possess greater social responsibility, being able to sensitise learners on the significance and practical value of indigenous knowledge. The literature reflects that teachers struggle to integrate indigenous and scientific knowledge; teachers are silent on how to alleviate those challenges. Studies should therefore explore agricultural sciences teachers' experiences of teaching IK. For instance, a study to investigate agricultural sciences teachers, pupils, and community members may be based on IK knowledge that could be incorporated into the agricultural sciences curriculum (denoting a gap) and their justifications on why it should be integrated, if at all.

However, international scholars like Sandoval (2005), Furtak, Seidel, Inverson, and Briggs (2012), Corlu, Caprano, and Caprano (2014), Garner and Eilks (2015), Garner et al. (2015b), and others view the teaching of sciences and mathematics in secondary schools from a

different perspective. The above authors concur that science-based instruction should include two epistemologies. Firstly, practical epistemologies include ideas learners apply to their scientific knowledge construction through inquiry. Secondly, formal epistemologies involve learners' ability to reveal or communicate knowledge regarding professional or formal science. Science practice should involve formal learning (prescriptive) that is efficient when incorporated into the non-formal learning (habitual), lying between informal (communal) and formal learning. Studies conducted recommend that knowledge (prescriptive), skills (communal), and beliefs (habitual) should drive the teaching of sciences. These researchers argue that a systematically structured curriculum with inelastic demarcation among science and mathematics subjects may be hindering the success of teachers.

By contrast, a flexible curriculum authorises teachers to teach sciences and mathematics in their natural context. This suggests that AGRIS teachers should possess abundant knowledge of integrating or affiliating learners' experiences to enact and implement the curriculum successfully. Teachers have to discern that non-formal learning invokes affective goals; informal learning elicits psychomotor goals; formal learning leads to cognitive goals. Therefore, teachers should be able to intertwine non-formal and informal teaching during their formal teaching.

Furthermore, in South Africa, scholars such as Khoza (2017a, 2017b, 2019), Khoza and Biyela (2020), and Mpungose (2018, 2020a, 2020b) have conducted various studies on how curriculum developers should balance the curriculum in higher institutions. For instance, they emphasise that tertiary education should embed vertical, horizontal, and diagonal knowledge. This emphasis emanates from their notion that three aspects (knowledge, skills, and values/attitudes/interests) should always drive teaching practice. However, the researchers argue that effective inculcation and dissemination of all three aspects requires integration of the performance-based, competency-based, and the pragmatic-based curriculums. According to these researchers, combining all three aspects assists in addressing subject, social, and personal needs, which in turn results in producing globally competent students. This suggests a gap in the teaching of AGRIS in secondary schools.

Hence, the performance curriculum (prescriptive perspective) drives the teaching of AGRIS in South African schools.

Be that as it may, the prescriptive perspective may deprive low socio-economic background learners, leaving them victims of poverty, lacking the skills and inability to apply knowledge attained in their real-life situations to the earning of a living. The prescriptive perspective capacitates learners with adequate knowledge (cognitive domain). However, this perspective omits what I believe is essential and fundamental to the teaching of AGRIS − the affective and psychomotor domains. Note that affective and psychomotor domains enhance better discernment of scientific concepts. Thus, this study may contribute to the body of knowledge because it addresses the challenges faced by AGRIS teachers in South African secondary schools. In agriculture, there is a gap in studies focusing on the teaching of AGRIS in South Africa. Most of the studies focus on industrial agriculture and conservation farming, thus improving the environment without attempting to transform individuals and their practice. The study is based on teachers' perspectives of teaching AGRIS in South African secondary schools. The study aimed to transform teachers, and improve the practice. The study is driven by a critical paradigm, permitting teachers to actively identify the gaps within the curriculum and to bridge those gaps. This study intertwines prescriptive (knowledge), communal (skills), and habitual (interests/values) perspectives in order to bridge the AGRIS curriculum gaps. The study appears a unique study within agriculture literature.

1.9 Objectives of the Study

- To establish teachers' perspectives of teaching agricultural sciences in secondary schools.
- To understand how teachers apply perspectives in teaching agricultural sciences in secondary schools.
- To explore the reasons for teachers having particular perspectives of teaching agricultural sciences in secondary schools.

1.10 Key research questions

- What are the teachers' perspectives of teaching agricultural sciences in secondary schools?

- How do teachers apply perspectives in teaching agricultural sciences in secondary schools?
- Why do teachers have particular perspectives of teaching agricultural sciences in secondary schools?

1.11 Research Methodology

1.11.1 Methodological approach

This study opted for a qualitative approach. Research of this nature is naturally realistic, and aligns with the habitual perspective (peoples' feelings, experiences, and meanings) (Eisner, 2017; Taylor*, Bogdan, & De Vault, 2015). It also became suitable for this study in exploring teachers' perspectives of teaching AGRIS in secondary schools. I was able to understand and make meaning of social issues (communal perspective) that occurred within the natural setting of individual teachers (Creswell, 2009, 2013, 2014). Maree (2010) articulates that researchers driven by this approach believe that the sustainable way of understanding and of knowing any phenomenon is by viewing it in its natural context. Moreover, a qualitative approach provided me with enormous opportunities to discern and describe distinctive ways in which AGRIS teachers create subjective meaning of their world (Christiansen, Bertram, & Land, 2010; Cohen`, Manion, & Morrison, 2018; Maree, 2007). This approach was fascinating because it drove me to consider teachers (participants) as original sources of data; thus data production, data analysis, and findings were determined by them (Creswell, 2014; Creswell & Poth, 2017). This approach assisted this study to transform and empower AGRIS teachers, intending to promote individual discernment and intensifying insight into human situations (Babbie & Mouton, 2008; Babbie, Mouton, & Strydom, 2011). I utilised this type of research (qualitative) to describe and understand habitual and communal perspectives in which teachers make sense of their lives and practice. This study was conducted to transform and empower AGRIS teachers with in-depth competencies required to improve their practice.

1.11.2 Research paradigm

This study was driven by the critical paradigm (communal perspective) since its intention was not only to describe and understand teachers' perspectives of teaching AGRIS in schools, but also to bring change within the practice (Cohen*, Manion, & Morrison, 2013;

Cohen` et al., 2018). I used this paradigm to bring social transformation that might be fruitful to teachers who lack opportunities to raise their concerns for various reasons (Christiansen et al., 2010; Creswell, 2013). The ontological assumption (communal perspective) of this paradigm is that the nature of reality is subjective, and embeds authority issues. At the same time, the epistemological assumption (habitual perspective) is that the nature of knowledge is embedded in the inclusion of participants' reflection, to bring fairness and change (Creswell' et al., 2012; Creswell, 2013). Therefore, I adopted this paradigm to assist and liberate AGRIS teachers who have no power, or who feel oppressed by the prescriptive perspective of the agricultural sciences curriculum, and restricted by government policies (Christiansen et al., 2010).

The above suggests that this paradigm might assist AGRIS teachers in transforming their curriculum to the extent that it best suits their (teachers' and learners') needs while addressing the social and political injustice of the curriculum (McGregory & Murnane, 2010). This paradigm motivated me to consider teachers as principal actors and valuable stakeholders throughout the data-production process (Creswell & Poth, 2017). During data production, teachers (participants) were permitted to be active researchers. The participants and I teach AGRIS and share similar sentiments regarding the AGRIS curriculum and its practice in secondary schools. This attests to us all being involved in bringing transformation without abuse of my position as researcher (Christiansen et al., 2010). This study used a critical paradigm to overcome all the social injustice involved in the subject exposed through teachers' perspectives. Thus it may enhance teacher transformation in the teaching of AGRIS and may lead to subject improvement.

1.11.3 Research approach

I found the action research approach optimal for this study, owing to its ontological and epistemological dynamics. This study intended to answer questions rooted in human perspectives (ontology) while maintaining a close relationship between the object studied and myself (epistemology). However, the type of action research that I opted for is known as emancipatory. Emancipatory action research is suitable because it is based on teachers' perspectives, wherein the reality cannot be calculated, but may only be constructed in the

mind. This type of research is optimal for the habitual perspective, in which AGRIS teachers reflected freely on repressive situations within their discipline (Christiansen et al., 2010; Kemmis, McTaggart, & Nixon, 2013). Furthermore, the involvement of habitual and communal perspectives in action research motivated teachers to work as a collective, sharing experiences and opinions which could resolve issues of concern to them (Christiansen et al., 2010). In addition, this called for a prescriptive perspective by ensuring that logical procedure was followed to solve problems, thus improving AGRIS practice (Christiansen et al., 2010; Denzin & Lincoln, 2011, 2012). Therefore emancipatory action research assisted this study in bringing an in-depth understanding of habitual, communal, and prescriptive perspectives. Christiansen et al. (2010), McMillan and Schumacher (2010), and Maree (2010) propound that action research is used to study contemporary issues to find solutions to those issues and to review specific people on their work. This study permitted the active participation of teachers in obtaining solutions to various problems they encounter in teaching agricultural sciences. This would transform and emancipate teachers so that they can improve their practice.

The action research is driven by four stages (Christiansen et al., 2010) − the study has undergone all stages. In Stage 1, we worked collaboratively with teachers in formulating questions used during the reflective activity. We did this to identify the problem and to deduce the relevant intervention strategy. Stage 2 embraced the implementation of what had been planned in Stage 1. Stage 3 aided me in observing teachers' actions during the intervention strategy decided on. In Stage 4, we considered whether the intervention strategy had worked, resulting in a second phase. Two phases lie within the nature of action research to ensure that individual participants execute all assigned responsibilities, leading to improved AGRIS practice. In every stage, participants executed assigned tasks to progress towards the liberation/emancipation of effective AGRIS teaching in secondary schools.

Moreover, this study ensured that this action research involved qualified teachers teaching AGRIS from Grades 10-12. The teachers worked independently in their respective schools (Christiansen et al., 2010; Creswell, 2013; Maree, 2007). This study was conducted within two districts in Durban, KZN. Therefore, the results cannot be generalised (De Vos, Delport, Fouche, & Strydom, 2014; De Vos, Strydom, Fousche, & Delport, 2011). However, they can

be connected to similar situations obtaining in other areas (Bartlett & Burton, 2010). The findings of this study are beneficial to those who participated within the selected districts, but can be related to similar conditions. However, the findings produced from the researched context cannot be applicable to another context.

1.11.4 Sampling of participants

This study employed purposive sampling to choose a manageable number of six AGRIS teachers in two districts in the Durban area. My selection was based on teachers of the same calibre as myself, who could provide insight into the research and who were interested in sharing opinions applicable to the research questions (Creswell, 2009, 2013; Etikan, Musa, & Alkassim, 2016; Palinkas et al., 2016; Ritchie, Lewis, Nicholis, & Ormston, 2014). The sampling of participants was also convenient because I selected those who were voluntarily available and accessible and in close proximity to me (Christiansen et al., 2010; Farrokhi & Mahmoudi-Hamidabad, 2012). The rationale for selection is that I needed volunteer teachers concerned about the lack of development in the subject and eager to transform and improve the state of AGRIS practice.

1.12 Data-production Methods

The study opted for the reflective activity, the one-on-one semi-structured interview, observation, and the focus-group discussion as methods of producing data.

1.12.1 Reflective activity

The reflective activity had ten questions that participants had to respond to in writing. The ‘what’ question drove this activity to obtain an in-depth discernment of teachers’ perspectives (prescriptive). This activity assisted me in identifying the gaps between what participants know and what they do not know in terms of capabilities and barriers (Coghlan & Shani, 2013; Vicary, Young, & Hicks, 2016). Fortunately, this activity aided us in gaining a more profound understanding of the perspective that drives the teaching of AGRIS. Participants answered this activity in the absence of the researcher, providing honesty in

their responses (Cohen* et al., 2013). I ensured that participants responded to the activity in their comfort space, but within adequately stipulated time; and observations followed.

1.12.2 Classroom observation

I chose the classroom-observation method to generate live data from all six schools (Cohen', Manion, & Morrison, 2007; Cohen` et al., 2018; Kruck & Schneiker, 2017; Yin*, 2015). Indeed, this method enabled me to confirm what participants wrote in their reflective activity (Ellis, 2016; Mligo, 2016). Observing an individual teacher in action assisted me in generating rich data about teachers' perspectives, which in turn assisted me in answering the research questions (Cohen' et al., 2007; Hodge, Lieberman, & Murata, 2012). This method acquainted me with an in-depth understanding of how teachers apply perspectives in the teaching of AGRIS, addressing the second research question of this study. Nonetheless, classroom observation directed this study towards a communal perspective instead of a prescriptive and habitual perspective. This account echoes that of Creswell (2007), who states that classroom observation provides direct entry into an individual's insight and understanding of problematic social affairs.

Further to the above, being present during individual teacher's lesson presentations worked well for this study; and this served as the greatest strength of this method (Creswell' et al., 2012; Creswell, 2014). This study managed to obtain a deep understanding of how teachers behave in their realistic settings. This method was flexible as it addressed other factors pertinent to research questions (Merriam & Tisdell, 2015; Yin*, 2015). For instance, observations were meant to address the 'how' question, but they also offered much about 'what', and 'why' questions. Thus, the classroom-observation method managed to bring additional data that also assisted during the interpretation of findings. However, using video recording and audio recording became the greatest challenge for the participants. As a result, I had to take descriptive field notes while I was observing. This became possible for me as I was not an overt but a covert researcher (Check & Schutt, 2012). Detailed notes taken during observations were employed in consequent one-on-one semi-structured interviews.

1.12.3 One-on-one semi-structured interview

The study adopted this method because of its powerfulness and flexibility, which contributed to eliciting in-depth information from participants (Hammond & Wellington, 2013). Initially, this method was designed to answer the third research question: Why do teachers have particular perspectives of teaching AGRIS? This research question was meant to capture distinctive ways in which participants made meaning of their personal experiences in their respective classrooms (Cohen, Manion, & Morrison, 2011; McMillan & Schumacher, 2010). However, since questions were open-ended, the questions encouraged participants to develop narratives to all questions in distinctive ways that were optimal to them (Hesse-Biber, 2016). This is in line with Tuckman and Harper (2012), Betram and Christiansen (2014), Kruck and Schneiker (2017), and others' articulations that one-on-one semi-structured interview questions should seek for background, knowledge, experience, opinion, feeling, and sensory information. In other words, in this study, one-on-one semi-structured interviews resulted in accommodating social and professional world issues. However, I managed to channel the interview towards the personal world to obtain experiences that are more personal.

Via this method, I managed to gain critical insights and discernments that I might have overlooked in applying other methods. I gave much attention to body language and facial expressions during interviews, which made it possible for me to understand individual experiences. This method brought about rich data and appropriate data − information that catered for 'what' and 'how' questions. The habitual perspective drove interviews in this study. I adopted such to allow participants to reflect, based on their behaviour and beliefs (Christiansen et al., 2010). This study was not based on self-reported data; I ensured that I also utilised reflective activity, observation, and focus-group discussion as other means of producing data. Focus-group discussion contributions were also convenient to this study.

1.12.4 Focus-group discussions

The primary purpose of this study in adopting focus-group discussions was to explore teachers' beliefs, and why they behave in particular ways, and to understand the challenges of their practice (Lunt & Livingston, 1996; Rabiee, 2004). The study opted for focus-group

discussions to obtain in-depth discernment of 'what', 'how', and 'why' of teachers' utilisation of various perspectives during their daily practice. This suggests that focus-group discussion took a direction that moved towards the prescriptive, communal, and habitual perspectives. Briefly, this method provided rich data and in-depth information for this study (Dilshad & Latif, 2013) because I used the same participants who had been there from the outset (reflective activities, observations, and interviews). Thus, in the context of this study, focus-group discussions provided deeper discernment on teachers' perspectives. The participants offered their insight, opinions, and knowledge (Nagle & Williams, 2013). I used the Zoom platform to conduct focus-group discussions, owing to the COVID-19 pandemic. Therefore, during the meeting, I recorded all the discussions, so as to identify participants during data transcription. The in-depth understanding of the data-production methods employed in this study assisted me in the data analysis.

1.13 The Procedure of Data Analysis

This study employed qualitative data analysis to make sense of the information obtained from AGRIS teachers (Cohen et al., 2011). During data analysis, this study tried to unearth perspectives of those teaching AGRIS, by analysing their experiences, opinions, and knowledge obtained during data-generation (Frick & Laudal, 2017; Grbich, 2012; Maree, 2010). The data analysis was embedded in thematic analysis: the raw data was organised, and separated into various themes to base the conclusion on findings (Cohen*et al., 2013; Creswell, 2013, 2014; Padgett, 2016; Taylor & Booth, 2015). I commenced by selecting information that readers would readily understand; sorted the information into themes to ease the drawing of a conclusion; and interpreted the data by detecting patterns, explanations, and propositions. Prescriptive (following a systematic procedure), communal (using data generated from participants), and habitual (the researcher selecting data that may be useful to readers) perspectives drove the qualitative analysis of this study. I ensured that the analysed data was indeed from the participants, to confirm the finding's trustworthiness.

1.14 Issues of trustworthiness

Trustworthiness was employed to assure the readers that the presented findings are worthy of being trusted (Creswell & Poth, 2017; De Vos et al., 2014; De Vos et al., 2011; Guba &

Lincoln, 2005; Noswell, Norns, White, & Moules, 2017). I considered four propositions: credibility, transferability, dependability, and confirmability (Cohen* et al., 2013; Cope, 2014; Denzin & Lincoln, 2011; Guba' & Lincoln, 1994; Yilmaz, 2013).

Credibility has to do with reality and people's lived experiences; therefore, it was important for the study to ensure that participants were allowed to verify that I had presented their true reflections (Guba' & Lincoln, 1994). I also adopted data triangulation (using more than one data-production method) to ensure credibility (Cohen et al., 2011; Cohen* et al., 2013). In other words, this study ensured credibility by creating a chain of evidence (Jwan & Ong' ondo, 2011) accumulated from participants. Thus, in the context of this study, a communal perspective drove credibility.

Transferability means that findings could be translated to other teachers with similar experiences and not involved in this study (Cope, 2014; Elo et al., 2014). The findings of this study may be advantageous to teachers and schools with the same experiences and characteristics. However, the findings of this study cannot be generalised for various reasons. For instance, each context is characterised by distinctive human factors and status that could contribute to different findings. A communal perspective drove transferability in this study.

Dependability in this study had to do with the reliability of data over time in different settings (Cohen et al., 2011; Wellington, 2015). I ensured that the research design aspects were discussed in detail and according to the remarks of relevant scholars. This was followed by the use of direct information and references. Moreover, this proposition had to do with documenting all the records regarding the research process in a traceable manner. Therefore, a prescriptive perspective grounded dependability.

Confirmability involves verifying the study's findings and ascertaining that it reflects participants' discernment rather than my prejudice (Cohen' et al., 2007). This study provided a means of verifying research results. This study provided an in-depth description of the data-production procedure to eradicate personal bias, while ensuring that I acknowledged my role throughout the research procedure (Cohen et al., 2011; Jwan & Ong' ondo, 2011). I

also sent the findings to all the participants to verify the findings and agree that they reflected what they (participants) had said. In this study, the habitual perspective drove confirmability.

1.15 Issues of Ethics

This study considered four principles to adhere to ethical issues, namely: to respect each participant's rights (autonomy); to do good (beneficence); to avoid any harm to participants (non-malfeasance); and to ensure equality when dealing with issues (justice) (Christiansen et al., 2010; Cohen et al., 2011, 2013; Creswell, 2009; Gray, 2013). Moreover, the study responded to Creswell's (2012, 2013) call to consider ethical issues before conducting research. For instance, I applied for ethical clearance from the university research office; this was granted. I also applied and received the gate-keeping letter to conduct this study from the Department of Education (DoE) Head of Department (HOD). Further to this, I wrote letters to principals of each school, asking for permission to conduct this study, to which they agreed. I communicated with participants via emails, telephonically, and verbally, to ensure that they understood all the dynamics of ethical principles from confidentiality, anonymity, voluntary participation, withdrawal to no payment. Participants thereafter committed themselves by signing the consent forms.

1.16 Delimitations and Challenges of the Study

This study was restricted to six teachers from two districts in the Durban area. The findings cannot be generalised to other districts, but rather, must be transferred. This study was rooted in action research, which is characterised by two phases. Phase One was initially conducted face to face and later on online platforms. Zoom and Skype platforms were adopted during the COVID-19 pandemic. This became a challenge for us; however, my supervisor assisted with the Zoom and Skype implementation procedure. Technology worked well for this study, empowering and transforming participants.

1.17 The Review of Chapters

1.17.1 Chapter I

This chapter aims at bestowing an in-depth understanding of the study's background and the rationale for conducting such a study. It contains the topic, the objectives, and the critical questions of the study. The brief literature review is based on prescriptive, communal, and habitual perspectives; research design, trustworthiness, and ethical issues will follow. This chapter provides readers with a summary of the study.

1.17.2 Chapter Two

This chapter is about knowing teachers' prescriptive perspective. Chapter Two clarifies that the prescriptive perspective is rooted in a performance-based curriculum and is centred on vertical knowledge. Thus, teachers driven by this perspective always adhere to principles such as content knowledge (scientific knowledge), objectives, hardware tools, instructor actions, discipline-centred methods, summative assessment, and the face-to-face milieu.

1.17.3 Chapter Three

Chapter Three deals with the discernment of teachers' communal perspective. This chapter reflects that the communal perspective is grounded in a competency-based curriculum, which embraces horizontal knowledge. This account permits teachers from this perspective to follow distinctive principles as opposed to the prescriptive perspective. Teachers driven by a communal perspective are dominated by indigenous knowledge, learning outcomes, software tools, facilitator actions, learner-centred method, peer assessment, and online milieu principles.

1.17.4 Chapter Four

This chapter denotes the habitual perspective of teaching AGRIS, rooted in the pragmatic-based curriculum that focuses on diagnostic knowledge (joins vertical and horizontal knowledge). This chapter presents the habitual perspective that aims to bridge the gap between the prescriptive and communal perspective. It exemplifies principles of both

prescriptive and communal perspectives. Teachers from this perspective usually consider teacher knowledge, aims, ideological-ware tools, researcher actions, a teacher-centred method, formative assessment, and the blended milieu.

1.17.5 Chapter Five

Chapter Five outlines the detailed research design which unpacks the methodology, research paradigm, research style, data-generation methods, sampling, data analysis, trustworthiness, and ethical issues of the study. The discussion of the research design was guided by the objectives and key research questions of the study.

1.17.6 Chapter Six

This chapter provides the presentation of findings as obtained during the data-production process. It presents direct information from the participants, and direct quotes were used to indicate that the data is valid. The presentation of findings was guided by themes that were rooted in CHAT concepts. Themes were discussed independently concerning the diagnostic stage and transformation stage to detect the level of empowerment on participants.

1.17.7 Chapter Seven

This chapter presents teachers' perspectives on bringing in theoretical analysis and directly responding to the following research questions: What are the teachers' perspectives of teaching agricultural sciences in schools? How do teachers apply perspectives in teaching agricultural sciences in schools? Why do teachers have particular perspectives of teaching agricultural sciences in schools? Furthermore, this chapter intends to combine the emerging principles from the literature in the evolution of the theory for teaching AGRIS. Note that the literature and the produced data together unpack the research questions.

1.17.8 Chapter Eight

Chapter Eight presents my philosophical position regarding quality teaching of AGRIS. My focus was on teachers' perspectives as they emerged from the literature. Scholars maintain

that the secondary school AGRIS curriculum should address subject needs (prescriptive curriculum), society/learner needs (communal perspective), as well as personal/teacher needs (habitual perspective). As a result, teachers' perspectives produced a PCHP theory, which is driven by relevant principles to assist teachers to teach what they know (content), why they understand it (values/attitudes), and how they understand it (social context).

1.18 Conclusion of the Chapter

This chapter drew an outline of what readers should anticipate in this study. Chapter One provided the background and rationale of the study. Subsequently, it provided the study purpose, the research objectives, and the critical research questions. Furthermore, the chapter gave the literature review, the delimitations of the study, data-generation methods, trustworthiness, and ethical issues. Moreover, it presented the overview of each type included in this study.

CHAPTER TWO

KNOWING TEACHERS' PRESCRIPTIVE PERSPECTIVES

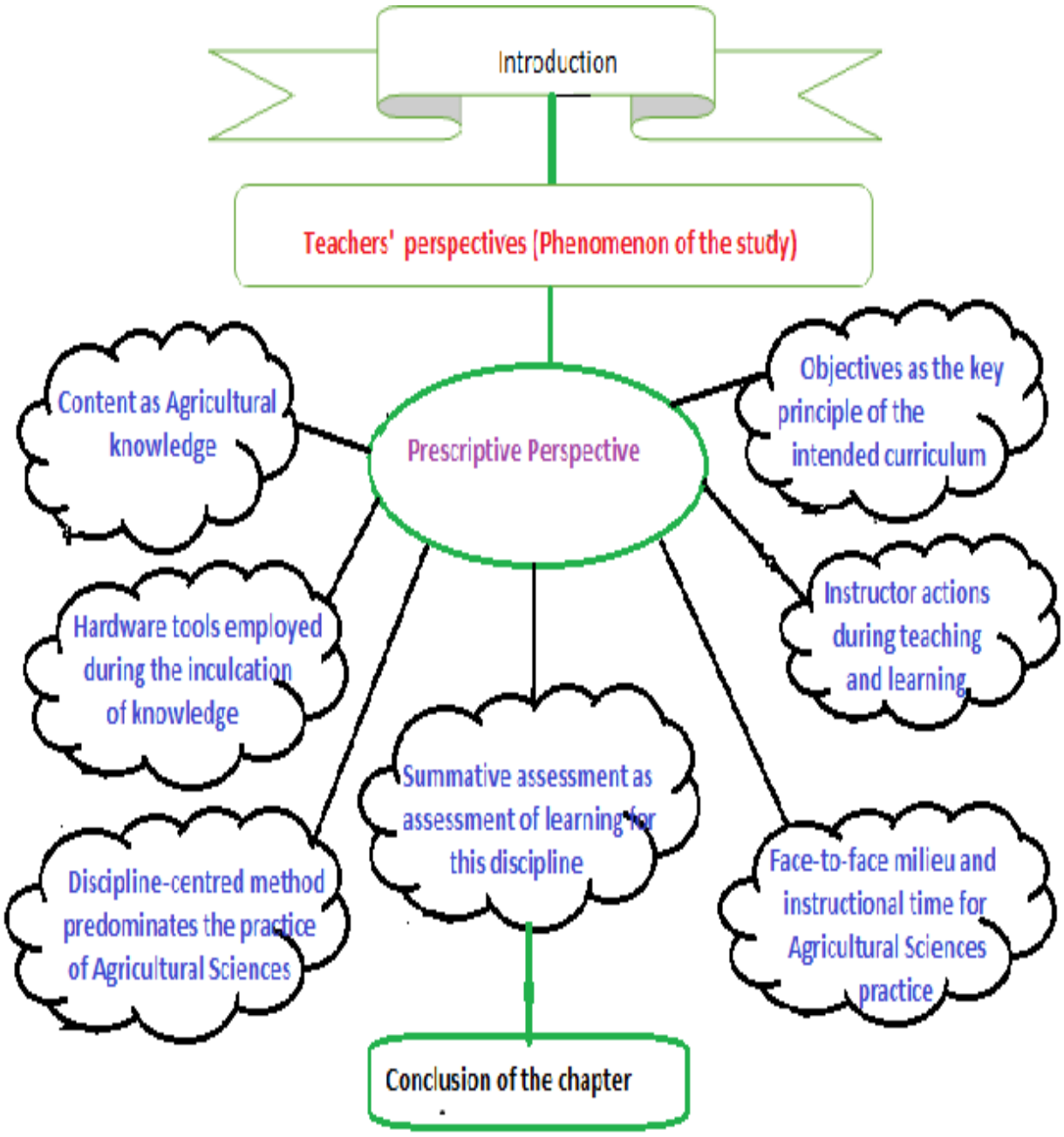

Figure 2.1: Chapter 2 Flow diagram

2.1 Introduction

The previous chapter illuminated the purpose of this study, which is to explore teachers' perspectives of teaching agricultural sciences in secondary schools in two districts of KwaZulu-Natal. This was attained by presenting the background or motivation of the study, prefatory literature, and a fundamental review on the theoretical framework, research objectives, and research questions; thereafter, the location of the study and research design. This chapter delves into related literature on teachers' perspectives (phenomenon). The literature review evaluates information available McMillan and Schumacher (2001) and gives a comprehensive account of what has been done by previous scholars on a particular determined phenomenon (Cohen et al., 2011). This connects studies to a broader, continual discourse in the literature, filling in gaps and developing previous studies (Marshall & Rossman, 2006). Therefore, the literature review frames the study within the existing literature and determines gaps in existing knowledge. Thus, this chapter embeds a prescriptive perspective as constructs of the conceptual framework for the literature review to provide an in-depth understanding of teachers' teaching of agricultural sciences in schools. After that, the conclusion of this chapter is drawn, leading to the following chapter.

2.2 Teachers' Perspectives (Phenomenon of the study)

Crotty (1998), one who subscribed to the notion of perspectives, defines this concept as a particular way of viewing the curriculum that depends on individual experiences (personal, social, professional). Other scholars like Pratt (2001), Pratt (2002), Trigwell and Prosser (2004), Clarke and Jarvis-Selinger (2005), Hyndman and Pill (2016), as well as Rotidi, Collins, Karalis, and Lavidas (2017) share a similar definition of teachers' perspectives. They agree that teachers' perspectives are interrelated structures of beliefs and intentions that provide sense and rationalisation for teachers' actions; they constitute the lens through which teachers view the world of teaching and learning. On the one hand, teachers' perspectives are pivotal to underpinning and permeating teachers' teaching methodology that influences learners' learning outcomes (Taylor & Booth, 2015). On the other hand, perspectives are essential in implementing curricular matters. As a result, they (perspectives) focus on how teachers identify themselves, how teachers translate and understand the curriculum, and how they enact and implement it (Crotty, 1998; Czerniewicz & Brown, 2014; Waghid & David, 2016).

The above suggests that perspectives provide shape and sense for educational practice. It is unlikely that teachers would have all the features involved for any one perspective. However, the teacher may have a perspective that seems to capture his or her attitude towards teaching and learning. Perspectives vary from one another in knowledge, learning, and teaching (Pratt, 2002). Scholars like Crotty (1998), Pratt (2001, 2002), and others affirm that teaching perspectives are not similar to teaching techniques. In essence, "every perspective incorporates fundamental beliefs about teaching and learning, instructional intentions within teaching context and actions *in situ*" (Clarke & Jarvis-Selinger, 2005, p. 5). Perspectives may assist in finding personal activity and belief that is not within the individual but within the collective, social aspects in which teachers' actions and interactivity occur. As a result, perspectives may provide a comprehensive understanding of how teacher differentiation is firmly established. Therefore, this study employs perspectives (Crotty, 1998) as a particular way of viewing the curriculum that depends on individual experiences (personal, social, and professional).

Scholars like Crotty (1998), Pratt (2001), Pratt (2002), Trigwell and Prosser (2004), Clarke and Jarvis-Selinger (2005), Hyndman and Pill (2016), as well as Rotidi et al. (2017), have contributed their ideas on teachers' perspectives. Scholars claim that effective teaching is a function of teacher maturation, which is grounded in five perspectives. (1) A transmission perspective (ability to deliver content); (2) An apprenticeship perspective (ability to model ways of being); (3) A development perspective (ability to cultivate critical thinking); (4) A nurturing perspective (ability to facilitate personal action); and a (5) Social reform perspective (ability to seek for a better society). However, this study draws attention to a transmission perspective as a prescriptive perspective, a development perspective as a habitual perspective, and a social reform perspective as a communal perspective. These perspectives are supported by the work of Crotty (1998), Czerniewicz and Brown (2014), Khoza (2015a, 2015b, 2016a, 2016b, 2017), Le Grange (2016), Waghid and David (2016), as well as others. Curriculum development (prescriptive perspective) should be in connection with ideologies (habitual perspective), and must accommodate individual differences including the pronouncements of teachers, learners and stakeholders (communal perspective) (Formunyan, 2014; Khoza, 2015a, 2015b, 2016a, 2016b; Le Grange, 2016; Waghid & David, 2016). Let various scholars discuss the prescriptive perspective.

2.2.1 Prescriptive perspective

The prescriptive perspective places the profession or content at the centre of teaching and learning (Czerniewics & Brown, 2014; Le Grange, 2016; Khoza, 2015a, 2015b, 2016a, 2016b; Waghid & David, 2016). The prescriptive perspective is dominated by vertical knowledge that develops the cognitive domain in learners (Berkvens et al., 2014; Bernstein, 1999). Teachers in possession of this perspective are strictly connected with content or subject-matter proficiency (Pratt, 2001) and are expected to systematically assist learners to master content (Pratt, 2002). Those who usually align themselves with this perspective acknowledge the presentation of accurate and efficient content as a fundamental principle (Clarke et al., 2005). Teachers using this perspective are invariably driven by written documents or textbooks (Peden, 2015). These teachers believe in hierarchically arranged and specific vertical discourse controlled by cognitive facets (Hoadley & Jansen, 2012). Vertical discourse (Hoadley & Muller, 2009) involves the use of explicit concepts that are within the prescribed content (conceptual advance); and explicit language and grammar utilised in the planned content (objectivity).

Moreover, these teachers intensely prioritise examinations and tests of content knowledge (Hyndman & Pill, 2015), while accentuating the setting of explicit standards for achievement (Rotidi et al., 2017). This perspective prioritises content to produce a performance curriculum where prescribed content (Hoadley & Jansen, 2012; Peden, 2015) comes to the fore. The teacher is a technician whose responsibility is to convey what is planned. Therefore, teachers holding a prescriptive perspective may exhibit deficits. For instance, they may experience challenges in assisting learners who find it difficult to understand the scientific reasoning of their content. This may cause a pitfall in predicting where and why learners can encounter difficulties with the content. Scholars like Khoza (2015c), Berkvens et al. (2014), Thijs and Van den Akker (2009), and others, concur that the prescriptive perspective is driven by content as a leading principle, which in turn brings to light other essential principles.

2.2.1.1 Content as agricultural sciences knowledge

The content is of paramount importance to the prescriptive perspective. Lederman and Abell (2014) define content as the information constructed by incorporating vertical knowledge during teaching and learning. Authors like Collett et al. (2011) and Strydom*, Ferreira, and Hanks (2012) believe that vertical knowledge is scientific. They argue that knowledge is only scientific if it is the systematic knowledge of the present; if that knowledge is obtained through study and education; if it is from books and computers; and if it is economically sustainable. This suggests that content, in this case, is focusing on the subject's needs. Therefore, a prescriptive perspective should permeate teaching and learning of content.

However, Preethlall (2016) defines content as knowledge based on abstract ideas that usually drive fact-based information segments from the universe. In contrast, Dlamini (2018) refers to content as principles, facts, theories, and concepts teachers teach to learners on a particular subject. Further to this, Kisaka-Jwan (2019) and Khoza (2019) view content as the subject matter of a particular discipline that teachers present to learners during teaching and learning. Teachers teach content, and learners grasp it to pass their grades (Khoza, 2013b, 2019b). The resonances across all these studies suggest that content is prescribed information written for a particular subject for teachers to deliver to learners. In this regard, a prescriptive perspective drives content, since it only addresses the subject's needs. Therefore, content is imperative for teaching and enabling teachers to evaluate and select learning material needed during teaching and learning (Preethlall, 2016). Teachers with an in-depth understanding of content may therefore be confident to use distinctive methods to enhance learners' discernment.

Rice and Kitchel (2015) conducted a study to explore knowledge bases for teaching agriculture, comparing the relationship between years of teaching experience, sources of knowledge, and content knowledge development. A questionnaire was used on 497 teachers for the 2012 – 2013 school years. Findings concluded that the content knowledge construct was rated highly. These scholars believe that the demand for content knowledge may be higher in agricultural education owing to the breadth and depth of content covered. Similarly, Lee and Luft (2008), as well as Borg (2015), support the results obtained by Rice and Kitchel (2015), as these also emphasise the importance of content knowledge. However, none of

these scholars highlighted the content that needs to be covered in agriculture education. Thus, it is evident that the prescriptive perspective drives content knowledge to meet curriculum developers' intentions.

Content taught in agricultural sciences varies from one country to the other. For instance, Zimbabwe offers agricultural sciences from primary, to junior, senior, and upper secondary school. Secondary agriculture involves general agriculture; crop husbandry; farm and machinery, and agricultural economics (Biriwasha, 2012). In the Federal Republic of Nigeria, agricultural sciences is accessible to junior and senior secondary schools. The Nigerian curriculum in senior school focuses on three core areas: production (food production), projection (agronomy and forestry), and economics (agricultural economics and farm management) (Akinwande, Olorundare, & Uphai, 2016). However, the content offered in Nigeria is in line with the agricultural occupations (Obiosa, 1998). For instance, the secondary certificate holders who studied agricultural sciences have the following occupations to pursue under the production areas: *Crop Production*: garden store operator; farm operator; vegetable gardener; nursery operator. *Forest Management*: forest guard (forest protection). *Pasture and Forage Management*: herdsmen; cattle farmer; poultryman; flock manager (for pullets and broilers). *Agricultural Economics*: produce inspector; farm produce salesman; farm-produce buyer.

Furthermore, Future Farmers America (FFA) has designed and constructed a learner manual with proficiency activities for all learners studying agricultural sciences in secondary schools. The FFA handbook has approved practices such as a supervised agricultural experience programme (SAEP); Agricultural Electrification and Mechanisation; Agricultural Processing; Diversified Livestock Production; Diversified Crop Production; Horticultural and Farmstead Improvement; Agricultural Sales and Services; Speciality Animal Production; Forest Management; Agricultural Judging Content Activities; and Public Speaking in Agricultural Areas. This suggests that the agricultural sciences curriculum in Nigeria is in line with the prescriptive perspective. It denotes the intended content, activities, and careers that emerge from the content taught. Aligning topics with the prescribed activities and relevant careers may positively influence teachers and learners.

Consequently, this may stimulate self-confidence and mould a learner's character, while providing learners with opportunities to contribute to the agricultural economy.

The United States took a different globalised method to prepare learners for future careers in agriculture. This country collaborated with various states such as Tennessee, Alabama, Florida, Oklahoma, Texas, and Pennsylvania to identify international agriculture concepts for secondary educational curricula (Conner, Gates, & Stripling, 2017). The USA identified 24 concepts in five categories (a) production, (b) business, (c) culture, (d) environment, and (e) global awareness. Further, the US has recommended that curriculum specialists utilise all 24 identified concepts to internationalise agriculture in secondary schools. Below is Table 2.1 showing all the internationalised concepts.

Table 2.1: Identified Concepts for an Internationalised Secondary Agriculture Education Curriculum (Conner et al., 2017)

	Concepts
Production	*Challenges of food distribution* *World agricultural commodity production* *Land suitability and farming practices around the world* *Identify the varying degrees of mechanisation in production agriculture* *Global food systems and preferences* *Global GMO usage* *Overview of food security in different countries* *Overview of food production rates in different countries*
Business	*How free agreements impact US Agriculture* *Impacts of exports on the US Economy* *Impacts of imports on the US Economy* *Agricultural industry's global workforce affecting supply and demand* *The effects of global land use and environmental policies* *Impact of political conflicts on the world market*
Culture	*International career opportunities in agriculture* *Cultural effects on trade*

	Cultural effects on marketing *Overview of cultures in different countries* *Differing views on GMOs*
Environment	*The global role of water use in agriculture* *Impact of world food demand on the environment* *How global climates impact food production*
Global Awareness	*Overview of world hunger* *Differences in developed and developing countries*

The panel from six states agreed on the above 24 concepts that curriculum developers should incorporate into an internationalised secondary agricultural education curriculum within an agriculture, food and natural resources (AFNR) career cluster. However, the content they have identified is aligned with Step Three (selection of content) and Step Four (organisation of content) of Taba's (1962) curriculum development framework. This suggests that the United States curriculum for secondary based agricultural education (SBAE) is structured to best suit agriculture careers; Taba's (1962) theoretical framework is for teaching. In this regard, the United States agricultural sciences is dominated by the prescriptive perspective, which may promote the manipulation of other perspectives. This suggests that agricultural sciences in the United States is designed to encourage learners to pursue agriculture as a career. This is unlike agricultural sciences in South Africa, which leads learners to select other careers, owing to its broadness and haphazard structure or design.

In South Africa, agricultural sciences, as a subject, is vast compared with that in Zimbabwe, Nigeria, and the United States. In South Africa, AGRIS is offered in secondary schools, in the further education and training phase (FET). It is not applicable to the junior, intermediate, and senior phases. Agricultural sciences CAPS in South Africa's FET phase is structured to focus on numerous areas. The Agricultural sciences curriculum for Grade 10 involves agro-ecology; agri-industry, land reform, agricultural legislation, and agricultural organisations; agricultural economics; sustainable natural resource utilisation; soil science; animal studies; plant studies; biological concepts (Baxter et al., 2011; Collett et al., 2011; Strydom* et al., 2012). The Grade 11 curriculum includes basic agricultural chemistry; soil science; soil organic matter; plant nutrition; plant reproduction; plant genetic improvement; plant

pests/parasites and diseases; and optimal resource utilisation (Baxter et al., 2011; Collett et al., 2011; Moshia, Oberem, & Reinhardt, 2012; Scogings et al., 2012; Strydom* et al., 2012).

The Grade 12 curriculum involves animal nutrition and digestion; animal feed; animal production; animal shelters and management; animal reproduction; animal diseases and protection, and indigenous knowledge. Furthermore, there is agricultural genetics; agricultural production factors (includes accounting); agricultural marketing (economics); agricultural entrepreneurship (includes business studies) (Baxter et al., 2011; Burger, Phewa, & Burger, 2007; Collett et al., 2011; Moshia et al., 2012; Scogings et al., 2012; Strydom* et al., 2012). Apart from the above, the agricultural sciences curriculum has mathematical aspects across all grades and is mainly applicable to the Grade 12 curriculum. This suggests that the prescribed content in South Africa is too broad, and may limit proper implementation and inculcation of skills that could contribute to the South African economy. Lack of correlation between activities and available careers may discourage learners from pursuing agriculture as a career. This on its own indicates a need for a study to investigate teachers' perceptions of the prescribed content in the South African agricultural sciences curriculum. What do scholars believe about chemistry, mathematical aspects, and genetics as part of agricultural sciences content?

Chemistry is taught in the Grade 11 curriculum (Baxter et al., 2011; Burger et al., 2007; Strydom* et al., 2012). King (2012) and (Wishart, 2016) concur that teachers and learners perceive the subject as complex and challenging to learn. For instance, chemical bonding is one of the sub-topics in chemistry and is primarily taught via models, which are vital for the discernment of science (Bergqvist, Drechsler, & Rundgren, 2016). However, numerous scholars like Grosslight et al. (1991), Ingham and Gilbert (1991), Justi and Gilbert (2002), as well as Ozman (2004), as cited by Bergqvist et al. (2016), demonstrate that the use of models complicates comprehension of chemical bonding. Khoza (2014a) investigated engineering students' experiences in learning chemistry in one of the South African universities. In his study, Khoza avers that chemistry students consider such content complicated. As a result, some students decide to deviate from chemistry and pursue other courses. Nevertheless, Khoza (2014a) affirms that the sub-microscopic, macroscopic, and symbolic frame the teaching and learning of chemistry.

In addition to the above, there is no need to separate these levels; if so, learners may find it challenging to know and understand chemistry. In essence, the affirmation brought by Khoza may be the solution to the difficulties faced by teachers and learners in teaching and learning chemistry. Nixon, Campbell, and Luft (2016) argue that chemistry teaching requires teachers who understand the subject content, who have a degree in the discipline. However, scholars like (Van Duzor, 2012), Garner, Siol, and Eilks (2015a), as well as Garner and Eilks (2015) prefer the teaching of chemistry that is in line with other perspectives. This suggests that, to ensure better discernment of chemistry, teachers intertwine sub-microscopic, macroscopic, and symbolic levels in their sequential order, so that chemistry is not perceived as complicated and difficult. Going straight to chemistry while omitting the first two levels limits learners' knowledge and comprehension. Therefore, agricultural sciences teachers should follow the prescriptive perspective when teaching chemistry, thereby adhering to developing learners' cognitive domain. Most of the studies conducted on chemistry were based on teaching systems. A few studies were conducted to explore problems experienced by teachers during chemistry teaching. This indicates a need for a study to explore the teachers' reflections of teaching chemistry in agricultural sciences in secondary schools.

Furthermore, agricultural sciences includes mathematical calculations for the digestibility coefficient, energy values, nutritive ratio, Pearson square, fodder flow, and others (Department of Education, 2012). Authors like Burger et al. (2007), Baxter et al. (2011), Collett et al. (2011), Scogings et al. (2012), as well as Strydom^, Ferreira, and Holmes (2013) provide rules teachers should follow when teaching mathematical aspects. These authors proclaim that agricultural sciences teachers should: 1) Go through the calculations step-by-step, ensuring that learners understand each step as they go along; and 2) ensure that learners know formulas very well so as to calculate accurately. Even so, Stripling et al. (2014) compared pre-service agricultural education teachers' mathematical capabilities with the National Council of Teachers of Mathematics that were cross-referenced with the National Agriculture, Food and Natural Resources Career Cluster Content Standards. Findings showed that teachers are beneath the competence level. Studies conducted by Miller and Gliem (1996), Stripling and Roberts (2012a, 2012b), Stripling, Roberts, and Stephens (2014), and Wells (2015) concur with the findings obtained by Stripling et al. (2014). However, the studies conducted by the above scholars are based on pre-service agricultural education teachers. This indicates a need for a study on in-service teachers' competencies in

teaching mathematical aspects of agricultural sciences in secondary school. Another study may be based on teachers' experiences of teaching mathematical aspects of agricultural sciences in secondary schools.

In addition to content, Stern and Kampourakis (2017) postulate that the teaching of genetics content at schools should play a crucial role in assisting learners to accomplish genetics literacy. However, the existing literature on research reports complications and misconceptions. Current literature was reviewed and presented, highlighting the classic misunderstandings in specific countries, and on ages and background. Subsequently, the researchers offered suggestions for tackling those difficulties in teaching genetics at the secondary level. Table 2.2 below provides the outline of the misunderstandings associated with genetic literacy.

Table 2.2: Some Misconceptions about the Nature of Genetic Material, the Role of Genes, and the Nature and Potential of Genetic Technologies (Stern & Kampourakis, 2017, p. 203)

	Misconceptions about the role of genes	Misconceptions about nature and the potential of genetic technologies
Genes and DNA are different Genes are larger than chromosomes DNA is made of protein Unawareness that genes and chromosomes are related	▸ Genes determine characteristics ▸ Genes contain information for higher levels of organisation ▸ Genes determine skills ▸ Groups are genetically superior to others ▸ Race impacts genetic disease	❖ Trait selection in embryos ❖ Genes can be transferred between organisms and produce the same traits ❖ Genetic engineering can cure diseases by replacing genes ❖ Cloning can resurrect dictators or produce people with identical

Unawareness that most cell types contain genes Unawareness that DNA encodes information for proteins DNA is alive	Unawareness of the role of proteins in traits and disease	behaviours and psychological traits

The following are the causes of misconceptions related to the above.

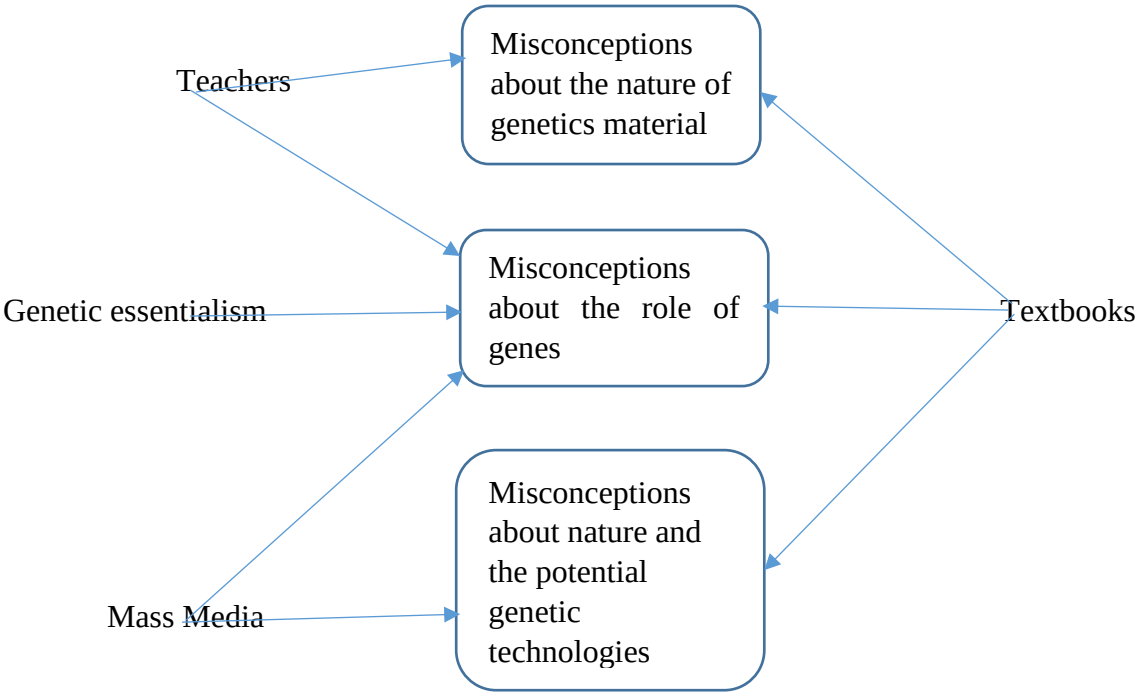

Figure 2.2: Secondary learners' misunderstandings about genetics and numerous aspects that can be responsible for these (Stern & Kampourakis, 2017)

Stern and Kampourakis (2017) therefore suggest that teachers should: (i) obtain the required knowledge both about genetics and about learners' misunderstandings, and prepare comprehensive teaching resources; (ii) be proficient at explicating complicated metaphors and distortions that are widespread; (iii) be equipped to reorganise the curriculum not with any normative standards but based on what supports learners' discernment. This suggests that agricultural sciences' genetics misconceptions emerge from the planned content;

therefore, the resolutions may emanate from the intended sources. Nevertheless, the Department of Education in South Africa has been conducting prescriptive perspectives without denoting misconceptions of genetics implementation. The above information may be beneficial to teachers, as it may address similar instances in our context.

However, the study that was orchestrated by Cebesoy and Oztekin (2018) concluded that teachers have adverse negative attitudes towards gene therapy and gene therapy application. As a result, they recommend that in-service science teachers extend their knowledge to handle new curriculum content such as genetics. They can attain this through professional development programmes. This indicates a need for a local study to explore agricultural sciences teachers' knowledge of genetics and genetic technologies. In addition, the teaching of agricultural sciences content requires a prescriptive perspective in which textbooks and other intended documentation should be employed systematically and logically as designed by curriculum developers. The deviation from the intended set of rules on how to teach to meet the intentions of the performance curriculum may lead to other perspectives.

Nonetheless, the agricultural sciences curriculum and assessment policy statement (CAPS) in South Africa is characterised by immense content compared with other countries such as Zimbabwe, Nigeria, and the United States. Other countries that distribute agricultural sciences from primary to secondary school teach according to prescribed activities that direct learners to pertinent careers. Unwieldy CAPS content in South Africa may hamper effective teaching and learning, and it may result in producing learners lacking in certain competencies. Curriculum developers should review the prescribed content, restructuring it to present the topics so that teachers adhere to the planned rules and regulations. Thereafter, developers may organise professional development programmes to acquaint teachers with anticipated misconceptions as well as their contributory factors. This may assist teachers to impart knowledge successfully in agricultural sciences teaching, and may improve the practice. According to Broakway (2015), content authorises teachers to formulate objectives for a particular lesson.

2.2.1.2 Objectives as fundamental principles of the intended curriculum

Ramirez (2016) and Queen (2017) define objectives as the statements that vividly explain predicted or expected learning outcomes. The objectives address subject needs, which require teachers' prescriptive perspective and the subject content (Khoza, 2013b, 2016b; Kisaka-Jwan, 2019; Mpungose-, 2018). Khoza (2013b, 2015b, 2016b), Queen (2017), Mpungose (2018) as well as Kisaka-Jwan (2019) concur that objectives belong to the teacher. Therefore, they are explicit expressions that are formulated following the teachers' intents. Kennedy, Hyland, and Ryan (2005) and Killen (2015) add that objectives and aims motivate teachers to decide on learning experiences that empower learners to achieve their learning outcomes. Moreover, Broakway (2015), Mpungose (2018) and Kisaka-Jwan (2019) believe that objectives state what the teacher is planning to teach; therefore objectives must be SMART in specifying the intentions of a particular lesson. Mpungose (2018) avers that generating objectives should involve trustworthy, relevant, and efficient words that match the context. However, Leslie (2014), Khoza (2013b, 2015b, 2016b), Dahri, Munir, and Dahri (2018), and Mpungose (2018) point to Bloom, who categorises instructional objectives into three features: cognitive (knowledge); affective (attitudes); and psychomotor (physical skills).

Thijs and Van den Akker (2009), and Berkvens et al. (2014), postulate that formulation of objectives should be based on the 3-S model. Tyler's 3-S model reflects that the formulation of objectives has to be based on the *triple S.* The first S stands for *students* who rely on teachers to develop their self-esteem and success. The second S stands for *society,* which capacitates learners with valuable competency within the community. The third S represents the *subject* quality content knowledge that reflects what society and learners need. Bloom's taxonomies and Tyler's3-S model propose the use of prescriptive, communal, and habitual perspectives. However, in South African AGRIS, the prescriptive perspective drives the formation of objectives.

Furthermore, the formulation of agricultural sciences instructional objectives should be based on various keywords such as *appreciate, provide, understand, know, grasp, determine, assist, develop,* and others. For example, to address the subject need during a particular lesson, "*I will develop learners' capability to identify Mendel's Law of Segregation and Law*

of Independent Assortment within various questions related to monohybrid and dihybrid." The objective for the topic on monohybrids and dihybrids may be formulated as: *"To assist learners to understand the prescriptive, habitual and communal framework in solving problems related to Mendel's First Law (Law of Segregation) and Second Law (Law of Independent Assortment)"*. The objectives may be formulated according to Tyler's 3-S model, for example, *"I will assist learners to differentiate between monohybrid and dihybrid (subject). Allow individual learners to determine factors that contribute to the plant's shortness or tallness (student). Ask learners to group themselves and discuss how a white goat female parent and a black goat male produce a black and white spotted offspring and explain how a black and white offspring produce a black offspring as its first generation (society)"*.

Agricultural sciences in South Africa is a performance curriculum, and objectives are imperative in addressing curriculum developers' intentions (Berkvens et al., 2014; Hoadley & Jansen, 2012), hence not prescribed in the CAPS document. However, the Federal Republic of Nigeria's national policy stipulates the specific objectives for introducing agricultural sciences in secondary schools (Akinwande & Olurundare, 2016; Modebelu & Nwakpadolu, 2013; Otekunrin, Oni, & Otekunrin, 2017). 1. To stimulate and sustain learners' interest in agriculture. 2. To provide learners with the interest to advance in farming. 3. To advance food production by improving agricultural production techniques in learners. 4. To provide entry-level occupational skills in agriculture to the interested learners. 5. To prepare learners adequately for producing and marketing farm commodities effectively and profitably. 5. To enable learners to acquire basic knowledge and practical skills required for future studies in agricultural fields. This suggests that teachers in Nigeria may be able to formulate instructional objectives using specific objectives provided. Unfortunately, in South Africa, this is not the case. South African teachers should formulate objectives that address the subject, learners, and society's needs independently. This suggests that a prescriptive perspective drives the formation of objectives in South African agricultural sciences.

Dahri et al. (2018) interrogated the use of objectives when they conducted a study to assess and examine Bloom's taxonomy usage at the secondary level in the teaching of science

subjects in Sidhi. Five hundred and eight science teachers and 50 principals were the participants. A questionnaire and interview protocol was used as data-generation methods through the stratified random sampling method. The study concluded that 83% of teachers fail to employ knowledge, comprehension, and application (the first three levels of Bloom's taxonomy) during teaching and learning of science subjects. Most principals accepted that they have no genuine understanding and knowledge of instructional objectives. Dahri et al. (2018) recommend the training of science teachers by the subject specialists, heads of departments (HODs), and principals, strictly monitoring how teachers utilise Bloom's taxonomy in their respective classrooms. The study highlights that principals should monitor the effective use of Bloom's taxonomies; while the findings showed that most principals lack knowledge and understanding of instructional objectives. This signifies a gap that the study at hand may bridge by bringing an in-depth understanding of instructional objectives and Bloom's taxonomies. This further indicates a need for a local study to explore the usage of Bloom's taxonomies in the teaching of agricultural sciences in secondary schools.

The South African agricultural sciences CAPS document does not specify the instructional objectives for its content, or specific objectives for introducing the subject in secondary schools as stated in the Nigerian curriculum. The CAPS only stipulates the general aims, which are referred to as the National Curriculum Statement Grade R-12 aims. The document states that the general aims of the South African curriculum give expression to the knowledge, skills, and values worth learning in South African schools (Department of Education, 2012). However, the document is silent on how teachers can attain such, and how teachers should formulate objectives. This signifies that irrelevant instructional objectives may misshape the teaching and learning of agricultural sciences in secondary schools (Broakway, 2015).

Moreover, the formation of prescribed objectives must be according to the 3-S Tyler's model to address knowledge, values, and skills. In this regard, teachers may also fail to control the prescribed content, owing to improperly formulated objectives. Therefore, agricultural sciences teachers may require professional development to formulate instructional objectives following Bloom's taxonomies and Tyler's 3-S model. Objectives guide teachers to select relevant resources, teaching activities, and assessments, to plan for a lesson effectively

(Killen, 2015; Khoza, 2015b; Ramirez, 2016). This infers that the formulation of objectives leads to use of hardware tools (Khoza, 2015c; Thijs & Van den Akker, 2009).

2.2.1.3 Hardware (HW) tools employed during the inculcation of knowledge

A HW tool is any device or structure used in teaching any subject. Hardware may be computers, laptops, tablets, videos, overhead projector machines, slide projectors, tape recorders, and others (Budden, 2017; Khoza, 2015c, 2017b, 2018). In the same light, HW is a tool utilised by teachers in conveying knowledge, skills, and information to learners (Mabuza, 2018). Mpungose (2018) defines an HW tool as a primary physical resource that can be engaged to execute systematic and fundamental functions in teaching and learning. These tools are tangible (Khoza, 2015c; Kisaka-Jwan, 2019), acting as an engine or brain for other tools (Mpungose-, 2018). HW tools work simultaneously with SW tools in order to offer information (Khoza, 2015b, 2016a, 2018). HW tools are suitable for both e-learning and face-to-face teaching and learning contexts (Budden, 2017; Khoza, 2017, 2017b; Lawrence & Tar, 2018; Nchunge, Sakwa, & Mwangi, 2013). Mpungose (2018), Khoza (2015c, 2016a, 2018) and Kisaka-Jwan (2019) assert that HW tools are instructional, being driven by the prescribed and instructional documents. These tools have the ability to be followed when used, and they provide effectual and quality conveyance of education facilities and curricula (Lawrence & Tar, 2018; Nchunge et al., 2013).

Teachers play a pivotal role in implementing information and communication technology (ICT) in schools (Ayub, Kamariah, & Rohayati, 2015). Such would be the case mostly in connection with the construction and conveyance of instructional objectives, and supplying learning resources for their learners. The researchers claim that teachers with positive computer attitudes are likely to favour computer incorporation in their classrooms. Therefore, the researchers conducted a study exploring the factors that affect teachers' attitudes in the incorporation of ICT into the teaching and learning process. Some 187 teachers from the state of Selangor in Malaysia were participants chosen randomly from a stratified sample. The results exhibited that teachers with years of teaching experience have negative attitudes towards utilising ICT in teaching and learning. The results of this study is attested to by studies conducted by Mohammed (2010) and Alabi (2016). In the same

breath, Nchunge et al. (2013) investigated teachers' perceptions on integrating ICT into the teaching-learning process. These researchers concluded that teachers could not employ hardware tools since they are lacking; and teachers also lack technical knowledge on use of ICT tools. Hulela, Rammolai, and Mpatane (2014), and Gebremedhin and Fenta (2015), concur with the results obtained by Nchunge et al. (2013). However, Mndzebele and Dludlu (2018) investigated factors related to incorporating ICT into the teaching of secondary school agriculture. These researchers concluded that teachers understand how to use hardware and software tools to make their lessons more eloquent for learners. Studies above are mostly concerned about factors that hamper the incorporation of ICT into the teaching of agricultural sciences. This indicates a need for a study to explore the impact of using ICT in the teaching of agricultural sciences.

The prescriptive perspective grounds the performance curriculum and drives the use of ICT. Teachers with years of teaching experience may be digital immigrants or may have been born before the digital age. These digital immigrants are dominated by the dynamics of the competency-based curriculum. Teachers who are digital natives have been born during the digital technology age and are dominated by the influences of the performance-based curriculum (Khoza & Manik, 2015). This indicates a need for a local study to explore the factors that influence the attitudes of agricultural sciences teachers in integrating ICT into the teaching and learning process.

In the same light, agricultural sciences HW tools also include the school garden, laboratory, library, the Farmers' Weekly magazine, food and fibre, a farm station, soil, rocks, posters, worksheets, and more. School gardens and farm stations are perfect places for learners to ask and answer questions about agricultural sciences (Graves, Hughes, & Balgopal, 2016). They are also pertinent to learners' real lives and provide hands-on inquiry actions, while backing up enrichment activities (Graves et al., 2016). The prescribed curriculum discourses are based on discipline standards (Khoza, 2013b, 2015b, 2016a, 2016b). For instance, laboratories intensify learners' attitudes towards agricultural chemistry (Barrie, Bucat, Buntire, Burke da Silva, & Crisp, 2016) bolstering their academic achievement (Musah & Umar, 2017). However, the laboratory is based on prescribed instructions, which requires

teachers' prescriptive perspective, limiting learners' development of higher-order questions (Ural, 2016). Umar (2017) investigated the effects of availability and utilisation of laboratory facilities and students' academic achievement in secondary schools in the Yabe state of Nigeria. The results reflected that laboratories are either unavailable or insufficient, and therefore they are not used. Moreover, the farm station drew on distinctive resources such as animals, types of feed, milking parlours, fields, and others, while signifying various types of knowledge, experiences, and values (Anglade, Godfroy, & Coquil, 2018). Therefore, the farm station "*is a tactile space where knowledge is embedded and embodied, nature new intelligibilities*" (Anglade et al., 2018, p. 1).

A laboratory, library, the Farmers' Weekly magazine, food and fibre, worksheets, soil, rocks, garden plants, and a farm station are associated with the prescribed curriculum. Therefore, when agricultural sciences teachers use these types of HW tools, they implement a prescriptive perspective and follow the stipulated procedure written by curriculum developers. However, teachers should plan prior to taking learners on field trips. For instance, they have to formulate objectives systematically, and design worksheets with questions learners have to respond to during observations. This suggests that learners should know what the teacher expects them to do during the field trip.

Agricultural sciences CAPS in South Africa does not specify anything about the use of HW tools. The agricultural sciences CAPS document is silent about HW tools teachers should use during the teaching and learning process. Agricultural sciences teachers may therefore fail to integrate HW tools into their teaching. Most schools offering agricultural sciences are Quintile 3 schools with no computer laboratories; most teachers are computer illiterate, and lack computer knowledge. Further to this, laboratories are unavailable, and if available, they are dysfunctional owing to a lack of resources. Therefore, this draws the attention of the Department of Education and relevant stakeholders to the need for ensuring that HW tools are accessible in schools, and teachers are effectively orientated on the importance of using technology in the implementation of agricultural sciences as depicted in the CAPS. Concerning HW tools such as school gardens and farm stations, curriculum developers should consider content condensation to allocate the necessary time for practical tasks in the

subject's annual teaching plan (ATP). Teachers fail to expose learners to practical aspects since they have to finish broad prescribed content within the allocated time. Therefore, instructional documents drive the HW tools and declare the teacher's action as an instructor (Khoza, 2015c, 2016a, 2018).

2.2.1.4 The instructor actions during the teaching system

The instructor is a content expert, always in charge of the teaching system to accomplish the instructional objectives within the stipulated time while organising content and activities for learners (Brown, 2018; Khoza, 2019a; Trammell & Aldrich, 2016). However, being a content expert is inadequate; instructors should have wider proficiencies that are driven by affective learning. Teachers should be able to integrate these into the curriculum instructional design (Loon & Bell, 2018). An instructor deals with various debates related to instruction; therefore, this calls for confidence in the knowledge of a particular discipline (Pudi, 2005). The goal of an instructor is to promote learners' comprehension of content knowledge, assisting learners to discern the concepts more precisely and proficiently (Frisby & Martin, 2010; Kamaravadivelu, 2003). Teachers can play various roles during teaching and learning, such as passive technique practitioner; reflective practitioner; or transformative intellectual (Tosuncuoglu, 2019).

Nonetheless, Kamaravadivelu (2003) views an instructor as a passive technique practitioner. This is because an instructor has to learn content knowledge commonly decided upon in the discipline, conveying it to consecutive generations of learners. Furthermore, the researcher affirms that an instructor has to be a canal directing the flow of content from an expert to a learner without meaningfully modifying or changing the content. In addition, LoPresto and Slater (2016) and Nguyen, Shekhar, Prince, and Waters (2016) eloquently postulate that the role of an instructor promotes passive learners who are eager to take notes; and it fails to push learners out of their comfort zone. For instance, during small group discussions, an instructor directly provides learners with correct answers, shows them solutions, and continually seeks straight answers rather than explanations. The teacher is often in a hurry to finish without providing adequate time to a group (Li* & Stylianides, 2017). It is claimed that, during the whole-class discussion, the instructor provides instructions, demonstrates by

example, limits time for the class to present their findings, and utilises the answers *yes* or *no* to specifically or generally direct learners to answers.

Apart from the postulations by the scholars mentioned above, Trammell and Aldrich (2016) and Kim (2017) believe that good instructors are maintaining a more structured milieu for learners' learning, ensuring that they offer quick feedback on learners' tests and assignments. Therefore, the authors conducted a study to explore undergraduate students' perspectives of essential instructor qualities. The participants were 100 females who were instructed to complete the online survey, which was used as a data-generation method. The results indicated that learners have significant anticipations for instructors to have numerous positive personality characteristics, teaching techniques, and content knowledge; and teachers must be approachable. This study focuses on students' expectations of the role of an instructor. The participants were females only who used an online survey as a data-generation method. This indicates a need for a study to explore agricultural sciences subject advisors' expectations of instructor actions during teaching. Both females and males should participate, using interviews and questionnaires as data-generation methods.

This suggests that, if an agricultural sciences teacher acts as an instructor, he or she should always be enthusiastic, proficient in all the topics, vividly presenting all the lessons and giving learners a reasonable amount of work. Agricultural sciences teachers who act as instructors have to adhere to content delivery to provide knowledge to learners as an integral part of the teaching and learning of agricultural sciences. For example, if the teacher has to teach chicken dissection, a systematic procedure starts by holding a chicken before slaughtering. This indicates that policy documents drive the instructor to standardise the content during the teaching process.

The agricultural sciences CAPS document in South Africa is silent on teachers' responsibilities during their teaching. However, during lesson preparations, it is stated that teachers should indicate their role during teaching together with the learners' role. Typically, teachers record what they and their learners will be doing during teaching and learning. The inability of curriculum developers to clarify teacher responsibilities during the teaching of

agricultural sciences permits teachers to teach according to their own individual discretion. This may cause deficits within the curriculum, since teachers lack understanding of instructor actions during the teaching system. The agricultural sciences curriculum in South Africa compels teachers to adhere to a discipline-centred method (Khoza, 2019).

2.2.1.5 Discipline-centred method dominates the teaching system

A discipline-centred method favours a particular subject (Khoza, 2016b), and permits teachers to transmit knowledge in their teaching practice (Buchs, Filippou, Pulfrey, & Volpe, 2017; Lindblom-Ylanne, Trigwell, Nevgi, & Ashwin, 2006). This enables learners to implement a superficial attitude to learning, mostly to replicate content as taught (Soomere, Lepp, Groccia, & Mansour, 2018). Gonzalez (2009) affirms that the discipline-centred method revolves around two notions of teaching − teaching communicating information, and teaching transferring organised knowledge. This signifies that teachers concentrate on the content and on what they do during the teaching process, while arranging and presenting the prescribed content in a manner that learners may understand with ease (Lindblom-Ylanne et al., 2006). A close correlation persists between teachers' discernment of good practice and their methodology of good practice. For instance, teachers who perceive teaching as knowledge transmission are dominated by discipline-centred methods such as rote learning, lecturing, drilling, and others (Cakmak & Akkutay, 2016).

The discipline-centred method emphasises teacher qualifications, prescribed content, tests, examination, notes, and handouts provision (Buchs et al., 2017; Gonzalez, 2009). Khoza (2013b, 2016a, 2016b, 2019a) and Mpungose- (2018) agree that the discipline-centred method reflects a cognitivist teaching theory, since activities employed are formal, and focus on the attainment of knowledge. For example, teachers may base the formulation activities on previous examination papers, textbooks, and other prescribed materials. In this case, the prescriptive perspective drives the discipline-centred method. Learners are tested regularly to ensure that they understand prescribed content (Khoza, 2015b; Mpungose, 2018). Therefore, if teachers utilise content to steer their lessons, they employ a discipline-centred method promoted by the South African agricultural sciences CAPS (Khoza, 2015b, 2016b, 2017b).

Kember and Kwan (2000) conducted a study to characterise the lecturers' different teaching methods and examine the connection between lecturers' methods of teaching and their perceptions of good teaching. Seventeen lecturers from three faculties were selected based on their level, as well as years of experience. The interview was used as a data-generation method. The study concluded that some lecturers were more likely to utilise discipline-centred methods as they considered that teaching was to convey information. This study was based on one university lecturer; one data-generation method was employed. Further to this, most studies were conducted in higher education. This indicates a need for a local study that examines secondary teachers' approaches to teaching of agricultural sciences.

Agricultural sciences teachers may employ the discipline-centred method to push the boundaries of the performance curriculum. The South African agricultural sciences CAPS curriculum is in line with a discipline-centred method, which reinforces the prescriptive perspective. For instance, agricultural sciences has the intended syllabus that teachers must complete for learners to pass formal examinations. Therefore, this method may be optimal for teachers to address the curriculum developers' intentions regarding content delivery. This suggests that teachers' continuous use of the discipline-centred approach may channel their teaching towards producing learners with adequate knowledge to pass standardised exams.

However, scholars like Yin[1], Han, and Genshu (2017) and Kim (2017) criticise the use of the discipline-centred method. Kim (2017, p. 38) notes that this method "*turns teachers into town criers and failed to recognise the complexities and varied learning styles of individuals. It also distorted our educational landscape by sacrificing other crucial components of education*". In his study, Kim (2017, p.38) compares the traditional and the flipped classroom while examining the efficient flipping approaches. At the same time, Yin et al. (2017) investigated the influence of Chinese tertiary teachers' goal alignments for teaching using their methods. The researchers maintain that the discipline-centred method discourages learners' active involvement during teaching and learning. This suggests that other perspectives drive the reasoning of the above scholars.

In the same breath, in their study investigating the effect of lecturers' expectancy of students in sense-making on the quality of taking notes, Dukhan, Brenner, and Cameron (2019) justify the use of the discipline-centred method. The above researchers posit that this method is best applied when one wants to complete the syllabus. Passive learning is the custom in this method, since learning is encouraged by collecting facts pertinent to and required to be recalled for the formal assessment (test or exam). Loon and Bell (2018) add another justification by postulating that broader content scope and overcrowded classrooms eventually compel teachers to shift to the discipline-centred method to complete the prescribed topics on time. (See their study examining the pivotal role feelings play in improving cognitive skills; and how students interrelate with reflection and knowledge). This suggests that a prescriptive perspective drives the world of the scholars above.

The agricultural sciences CAPS in South Africa may fail. The CAPS pushes the boundaries of the performance curriculum while being unable to outline the approaches teachers should employ to meet curriculum developers' intentions. The prescriptive perspective drives agricultural sciences, and addresses the subject's needs. Therefore, teachers should adhere to discipline-centred methods and ignore other methods that may drive them to other perspectives. However, the CAPS document should stipulate various approaches relevant for agricultural sciences practice to improve teaching quality. Khoza (2015b, 2016a, 2016b) and Mpungose (2018) highlighted that the discipline-centred method forces teachers to use the summative assessment.

2.2.1.6 Summative assessment as the assessment of learning for this discipline

Summative assessment is the assessment of learning (Bennett, 2010; Berkvens et al., 2014; Khoza, 2019a; Thijs & Van den Akker, 2009). This type of assessment is a logical way of assessing or evaluating how well learners progress in a grade in a specific subject (Department of Education, 2011). A summative assessment measures the amount of content mastered by each learner in a specific discipline, or substantiates the level attained by learners on the instructional or learning objectives (Kibble, 2017; Torres & Leite, 2014). At the same time, known as inspiring deep rather than superficial methods of learning, the summative assessment stimulates an extreme level of cognitive involvement over a particular period (Carless, 2015). Hoadley and Jansen (2012) aver that summative

assessment is the assessment that provides clear direction to parents and other stakeholders on teaching and learning occurring in schools. Thus, this type of assessment puts the product of teaching and learning at the centre (Bennett, 2010).

On the one hand, Khoza (2015b), Harrison, Konings, Schuwirth, Wass, and van der Vleuten (2015), as well as Dixson and Worrell (2016), base summative assessment on the assessment of what learners know or have retained after learning classification. On the other hand, Agboola and Hiatt (2017) and Buchholtz, Krosanke, Orschulik, and Vorholter (2018) view this type of assessment as a measure to evaluate the amount of learning that has taken place. Summative assessment also ensures the attainment of prescribed standards, summarising all gathered proof up to a specified point to produce either a relative or numerical ranking. In essence, summative assessment controls the teaching process; therefore, teachers are expected to complete the syllabus on time, allowing students to perform exceptionally in standardised tests and examinations (Peden, 2015). Furthermore, summative assessment is structured to provide teachers with guidelines for preparing learners for this assessment (Dixson & Worrell, 2016). A summative assessment is characterised by the teacher and learner having accountability (Bijsterbosch, Van der Schee, Kuiper, & Beneker, 2016). This indicates that this type of assessment is one with high stakes (Harrison, Konings, Schuwirth, Wass, & van der Vleuten, 2017). The provincial or national government mandates such, and teachers cannot intervene with their contributions to the formation of this assessment.

Morgan et al. (2018) highlight that teachers feel the pressure to teach learners who can perform excellently on standardised tests and exams. Therefore, the above researchers conducted a study to investigate the degree to which North Carolina agricultural sciences teachers utilise test item banks on summative assessment. Some 338 agriculture teachers were participants, and a survey was used as a data-generation method. Findings revealed that teachers effectively use item bank questions to prepare learners for standardised tests and examinations. In the same light, another study conducted by Bijsterbosch (2016) explored how geography teachers construct internal school-based examination questions. The study concluded that teachers hardly construct questions themselves; however, they rely on test items from outside sources. However, the results obtained by Morgan et al. may be relevant to the North Carolina context; therefore, the findings may possibly not be transferable to the

South African context. This indicates a need for a local study to explore agricultural sciences teachers' practices on the summative assessment.

Lau* (2016) argues that a summative assessment encourages teachers to follow a 'teach to test' principle to advance learners to the next grade. As a result, it accommodates the 'pass or fail' decision (Harrison et al., 2015; Harrison et al., 2017; Lannone & Jones, 2017). In addition, this assessment is utilised to classify and compare learners' abilities, and ensure that set standards are met (Broadbent, Panadero, & Boud, 2018). The findings obtained by Morgan et al. (2018) and Bijsterbotch (2016) attested to teachers' inability to formulate standardised tests and examinations; they rely on item banks for test questions. This suggests that teachers may fail learners who should progress to the next grade; or teachers may pass learners every term since this assessment focuses on what learners know rather than what they can do. Teachers should be assisted to set standardised tests that may aid learners in excelling in standardised examinations.

Nonetheless, summative assessment works against learner creativity because it is informed by learner performance and achievement. Inevitably, this type of assessment aims to report on learners' level of learning at a particular time. Thus, agricultural sciences teachers should assist learners to focus on addressing criteria and obtaining good marks, which count towards their term or end-of-year results. This assessment is an academic driver to stimulate learner effort and to control learning performance. This assessment permits teachers to exercise power and control over learners during teaching and learning. However, the critiques brought by various scholars indicate that there is a need for other types of assessment that may work in harmony with the summative assessment.

However, scholars like Houston and Thompson (2017), Stolz (2017), Dolin, Black, Harlen, and Tiberghien (2018), and others criticise the use of the summative assessment. Houston and Thompson (2017) argue that this type of assessment focuses on merit, endorsing learner achievement while failing to provide feedback information to learners to direct consequent learning; assessment is not aiming to assist learners with upcoming learning. Hence, Stolz (2017) claims that summative assessment mystifies educational standards by making test

performance better. Summative assessment usage embraces schools and teachers to justify learners' learning while forcing teachers to teach prescribed content and to be liable for learners' learning. Summative assessment deprives teachers of judging what is well-thought-out quality and appropriate teaching. In the same light, Dolin et al. (2018) point out that summative assessment seems to indulge all learners similarly by issuing a similar task to all learners. However, summative assessment is different from giving learners equal opportunities to display their discernment, or what they can do.

The South African agricultural sciences CAPS document stipulates the importance of summative assessment in this curriculum. The pivotal role of summative assessment is attested to by the highest percentage allocated to this type of assessment. For instance, each term, the summative assessment is worth 75%, while the formal task is worth 25%. The CAPS document indicates that summative assessment requires teachers to administer standardised tests or examinations in conjunction with formal tasks to create learners' portfolios of work as evidence. In addition, summative assessment and formal tasks are subject to moderation for quality assurance, ensuring that relevant standards are maintained (Department of Education, 2011). Therefore, the evidence collected may assist teachers in reporting individual learners' achievements to parents and other stakeholders. It is quite evident that if a learner fails tests or examinations, he or she fails the term or grade. Such circumstances evince that agricultural sciences in South Africa is driven by performance curriculum, which is grounded in a prescriptive perspective. The prescriptive perspective drives the face-to-face milieu (Khoza, 2015c, 2017b, 2019a).

2.2.1.7 Face-to-face milieu and instructional time for agricultural sciences practice

Face-to-face teaching is the fundamental mode of teaching, which inspires teachers to provide a tailored direction in the classroom according to teaching conditions through various teaching techniques (Liu, 2019). According to Bandara and Wijekularathna (2017), the face-to-face milieu permits learners to concentrate during teaching and learning and to have a reliable line of communication with the instructor and their classmates. On the one hand, teaching and learning that occurs face to face fosters a positive inculcation of knowledge, and stimulates learners' full participation; hence requires actual time and

evidence-based learning for learners (Liu, 2019). On the other hand, face-to-face teaching is the instructional teaching quality seen when instructors' actions in the classroom facilitate learning and sanction ideal cognitive learners' evolvement (Sanchez-Rosas & Esquivel, 2016).

Herath and Crosling (2012) argue that the face-to-face milieu is of paramount importance in educational settings. Therefore, they conducted a study to examine face-to-face teaching of economics in an Australian university. Twenty-nine students were participants. Nineteen students undertook a survey, and ten students were divided into two focus groups. The results exhibited that for the whole group, the lecturer's physical appearance is a pivotal element. Students prefer face-to-face teaching, the lecturer explaining while students receive support as teaching and learning continue. Young and Duncan (2014) orchestrated a study to compare students' instructional online and face-to-face ratings in higher education. Their study yielded similar results to those of Herath and Crosling. However, the study conducted by Herath and Crosling (2012) was limited to students of economics; and the sample was not significant. This indicates a need for a local study that will involve a large population in which the researcher may use more than one data-generation method to ensure triangulation and trustworthiness. The anticipated study may focus on exploring how face-to-face teaching influences the performance standards of agricultural sciences in secondary schools.

In addition to the above, some instructors associate face-to-face teaching with closeness or familiarity, involvement or engagement, and efficiency that provides significance to learning (Burgess, 2015). At the same time, others perceive this milieu as their platform from which to disseminate knowledge to learners using procedural instructional methods. Teachers demonstrate in front of the class, and learners imitate what they have learned from the demonstration (Nicholls, Sweet, Muller, & Hyett, 2016). Apart from what Nicholls et al. posited, this milieu also improves learners' achievement. Instructors usually utilise distinctive teaching strategies or interferences, such as differentiation, time on task, direct instruction, and feedback, that could be recognised and connected to learners' achievement (Lu* & Lemonde, 2013; Mikeska et al., 2017). Face-to-face instruction plays a pivotal role within the evaluation of teaching quality, for example, classroom observation. This milieu

also assist research observers in obtaining an in-depth understanding of participants' actions during the teaching process. For instance, it brings understanding of the prescribed content, instructional strategies and classroom management techniques employed by the participant in natural setting as a proof of what was narrated or wrote in other data generation methods (Gitomer, 2019). Studies conducted by scholars mentioned above were addressing the positive impact of the face-to-face milieu on quality teaching. Little has been conducted on the use of videos during face-to-face teaching in secondary schools. This indicates a need for a study to explore the benefits of using videos in the face-to-face milieu during the teaching of agricultural sciences. Scholars should discuss the time allocated for teaching agricultural sciences.

Khoza (2013b) defines instructional time as the duration of time that teachers use to teach learners. Khoza (2013b) further delineates that teachers teach their learners in schools utilising the face-to-face milieu following the prescribed timetable. Likewise, Mqadi (2016) views instructional time as more comprehensive settings enlightened by policy documents, the curriculum per se, and the school timetable. Fisher* et al. (2015) refer to instructional time as the quantity of time assigned to teachers in a specific curriculum content area that is positively related to learners' learning in any discipline. Khoza (2015b) orchestrated a study based on student teachers to reflect on the CAPS practices. Khoza (2015b) affirmed that, on the one hand, some teachers agree that time allocated for the content is the strength of the CAPS. On the other hand, teachers mentioned that teachers' union meetings, workshops, and moderation take up teaching and learning time. However, this study was conducted on student teachers who had to reflect on the CAPS implementation. This indicates a need for a study to explore in-service teachers' experiences of implementing the agricultural sciences CAPS curriculum.

In agricultural sciences, the face-to-face milieu accentuates one-on-one connections that learners can create with their instructor to master the content further. Learners may have personal interactions with teachers, which may promote easy learning, while at the same time authorising learners to interrelate with one another, thus strengthening learning. In addition, agricultural sciences teaching and learning occur within a restricted area, such as

classrooms and laboratories; and within a stipulated time. The face-to-face milieu thus serves as a platform on which agricultural sciences teachers may cascade prescribed content to learners within the allocated time. Moreover, if teachers fail to utilise the time stipulated, learners may not perform accordingly, since content coverage in the classroom may not be completed. In this regard, allocating time per hour suggests involvement in a prescriptive perspective. Teachers plan discipline-centred activities in line with relevant tools and a summative assessment. Therefore, the face-to-face milieu and hours allocated for teaching and learning are driven by the prescriptive perspective more than other perspectives.

The agricultural sciences CAPS document in South Africa is silent on the milieu in which agricultural sciences teaching should occur. However, I have not come across studies that review the literature on face-to-face teaching in secondary schools; more literature is based on higher education. This indicates that teaching and learning in South African secondary schools may usually occur in the classroom, since one of the crucial aspects of teaching is a classroom management, driven by performance curriculum. The Department of Education (2012) stipulates that agricultural sciences teaching and learning should occur within four hours per grade per week. The teaching time is allocated in the South African ATP for agricultural sciences. However, time for the meetings, workshops, moderations, and field trips are not catered for; this results in too much pressure on teachers' time. Teachers have to work extra hours, offering extra lessons during morning study, afternoon study, and school holidays. The CAPS is silent about extra classes, which may bring deficiencies towards proper implementation of the performance curriculum.

2.3 Conclusion of this Chapter

This chapter gave the definition of teachers' perspectives as the phenomenon of the study. The literature depicted here provided the conceptualisation of the prescriptive perspective of teaching agricultural sciences in secondary schools. Furthermore, the chapter has outlined the prescriptive perspective principles, which drive the South African performance curriculum. Therefore, this chapter exhibited distinctive principles, namely: content, objectives, hardware tools, instructor actions, the discipline-centred method, the summative assessment, and the face-to-face milieu, together with instructional time. The subsequent

chapter seeks to outline the communal perspective of teaching agricultural sciences in schools.

CHAPTER THREE

DISCERNMENT OF TEACHERS' COMMUNAL PERSPECTIVE

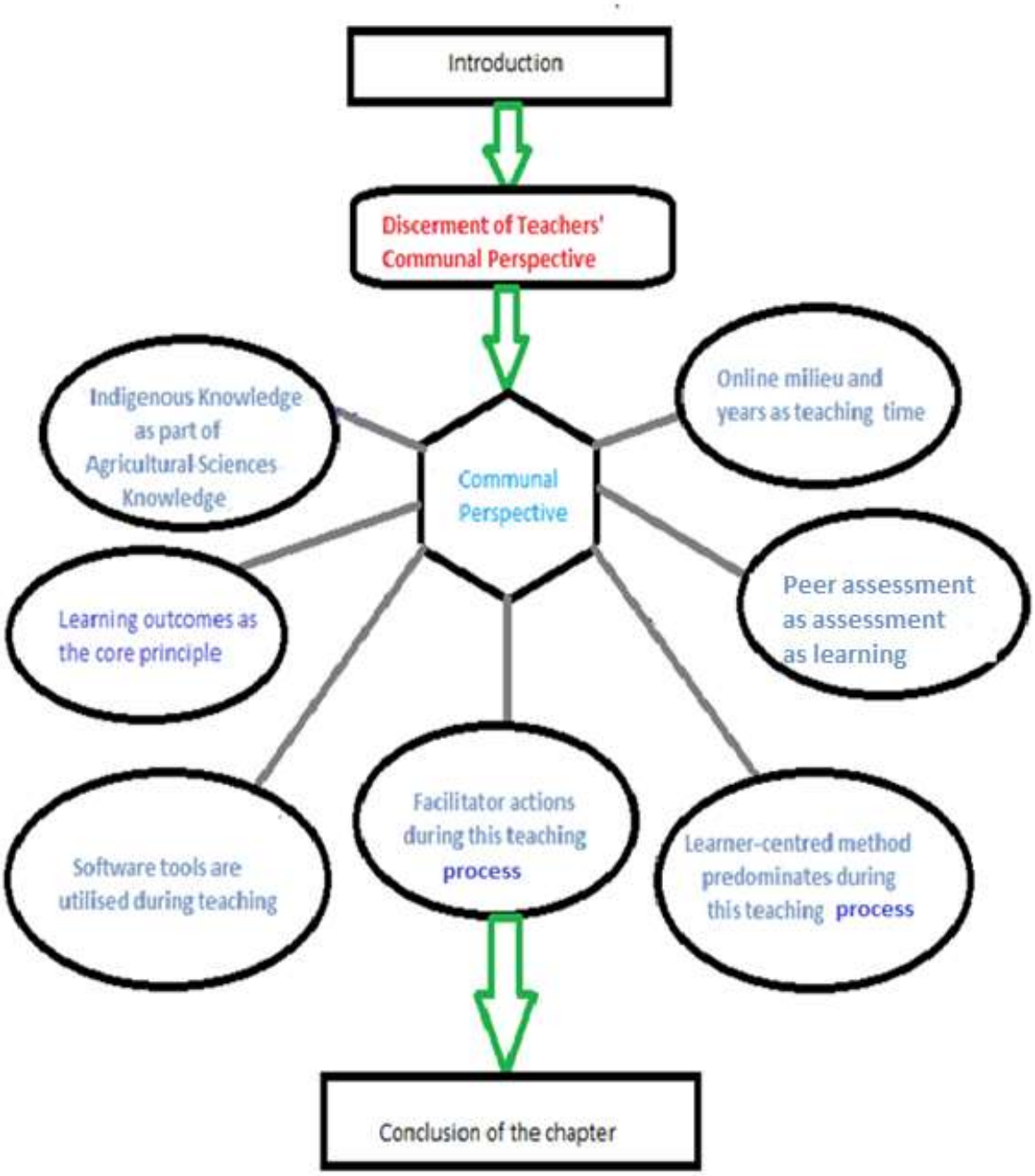

Figure 3.1: Chapter 3 flow diagram

3.1 Introduction

The preceding chapter was the first part of the literature, which offered teachers' perspectives as the phenomenon of the study, and the prescriptive perspective as one of the teachers' perspectives. The previous Chapter Two further provided the principles that underpin the prescriptive perspective, namely: content, objectives, hardware tools, instructor actions, the discipline-centred method, the summative assessment, as well as the face-to-face milieu aligned with instructional time. These principles were utilised to frame the prescriptive perspective discourse. The previous chapter provided in-depth knowledge of teachers' prescriptive perspective of teaching agricultural sciences in secondary schools. However, knowing the prescriptive perspective without the discernment of other principles may bring deficits to the agricultural sciences curriculum practice. This chapter (Three), which is the second part of the literature, intends to discuss the communal perspective and the principles that frame this type of perspective. Then follows the conclusion of the chapter. Various scholars discuss the communal prescriptive and its principles.

3.2 Communal Perspective

Scholars such as Bernstein (1999), Berkvens et al. (2014), Czerniewicz and Brown (2014), Khoza (2015a, 2015b, 2016a, 2016b), Le Grange (2016), Waghid and David (2016) believe that a communal perspective revolves around opinions. It puts society at the centre of teaching and is aligned with horizontal knowledge that develops the psychomotor domain. Horizontal knowledge is also known as practical or societal knowledge based on learners' experiences and problems existing in their distinctive communities (Khoza, 2019). This type of knowledge is subjective and dominated by local knowledge that is found in a particular context (Bernstein, 1999; Thijs & Van den Akker, 2009). Hoadley and Muller (2009) and Beinstein (2000) concur that horizontal knowledge is implicit, and context-dependent. At the same time, Hoadley and Jansen (2012) and Beinstein (2000) add that this is everyday knowledge that cannot be acquired in schools since it is contingent on social context and culture; it is practical and unsystematic. The horizontal knowledge is segmentally structured. This means that understanding the discourse differs regarding cultural diversities and specified events and practices (Harju & Akerblom, 2017).

Pratt (2001, 2002), Clarke and Jarvis-Selinger (2005), Hyndman and Pill (2016), and Rotidi et al. (2017) conducted distinctive studies that were based on teaching perspectives, concurring that the communal perspective brings a change in the society in substantive ways. In the same light, Clarke et al. (2005) highlight that the most controlling characteristic of the communal perspective is that the practice of teaching is naturally political; any discourse of teaching should be inseparable from the social milieu in which it takes place. In essence, they (Clarke et al., 2005; Hyndman & Pill, 2016; Rotidi et al., 2017) claim that, in this perspective, good teachers are recognised by being able to arouse learners' values and principles attached to social practices within their subject. However, Pratt (2001), Clarke et al. (2005), and Rotidi et al. (2017) confirm that teachers driven by the communal perspective challenge the status quo to motivate learners to contemplate how they (teachers) and their learners are placed, and constructed within specific discourses.

This suggests that agricultural sciences teachers should be better positioned to question what the content states, what it is not stating, what is included, and what the curriculum developers have omitted. Teachers should also be in a good position to discover who is represented or not represented in the content (Pratt, 2001). Consequently, this may produce learners capacitated with adequate skills to improve society and agricultural sciences practice. Beinstein (1999), Berkvens et al. (2014), and others affirm that the communal perspective is driven by knowledge constructed from peoples' opinions, which is called indigenous knowledge.

3.2.1 Indigenous knowledge as part of Agricultural sciences knowledge

Indigenous knowledge (IK) is defined by Jackson, de Beer, and White (2016, p. 494) as "*the unique, traditional, local knowledge and developed around specific conditions of women and men indigenous to a particular geographic area*." Likewise, Collett et al. (2011) and Tan (2016) refer to indigenous knowledge as customary information, skills, and technologies experienced by a local community, which is gradually obtained over time. Senanayake (2006), Collett et al. (2011), Strydom* et al. (2012), Mawere (2015) as well as Jackson et al. (2016) denote that this knowledge is of the past; it is learned by practise; it is stored orally and in cultural experiences; and is ecologically sustainable. Furthermore, Mothwa (2011) points out that societal or indigenous knowledge is crucial in constructing new information,

augmenting learners' prevailing information as it may display science relevancy to their everyday lives. Moreover, this knowledge varies from one culture to another. It is found in various fields such as agriculture, religion, health care, food preparation, health and education, and the management of natural resources (Abah, Mashebe, & Denuga, 2015; Ogunniyi, 2004). Furthermore, it might bring imminent career opportunities while evolving learners' entrepreneurial skills (Mothwa, 2011). The question is how this knowledge may be acquired.

In South Africa, not many studies have been conducted to acquire indigenous knowledge that schools and communities value highly. However, Webb (2013) investigated the indigenous knowledge that isiXhosa-speaking people value and feel should be incorporated into a school science curriculum, accompanied by justifications for their suggestions. This study was based in the Eastern Cape and involved science teachers, pupils, and community members. Interviews and open-ended questionnaires were used on a small sample of science teachers and pupils voluntarily, to sample community members whom they trusted with information. Their justifications for integrating indigenous knowledge into the school curriculum were related to social justice and cultural compassion. Little evidence was found that participants were cognisant of contemporary discernment underpinning the boundary of science and indigenous knowledge as specialties.

This suggests that the type of indigenous knowledge obtained addresses the needs of that particular context since the study was limited to isiXhosa mother-tongue-speaking people. The study setting was in the Eastern Cape (EC) province, and small samples were drawn from various members of each area of the EC. Preferably, small samples should have emanated from each area in the EC, and the community members should have been the indigenous knowledge custodians such as farmers, local artisans, and livestock keepers. This indicates a need for several studies that might be conducted in each province: small samples may be selected from all places in every province. For example, there should be small samples from KwaZulu-Natal, Gauteng, Mpumalanga, and other provinces. This may give curriculum developers an in-depth understanding of indigenous knowledge values within each province in South Africa.

In addition, scholars like Owuor (2007), Eyong (2007), Breidlid (2009), Magni (2017), Zidny and Eilks (2018) have conducted studies in different contexts underlining the paramount importance of indigenous knowledge in stimulating sustainable development and education. On the one hand, Naidoo and Vithal (2014) explored how teachers implement IK during science teaching. The researchers discovered that three methods may be involved during the teaching of IK, namely: the incorporationist method (integrating pertinent IK into science); the separatist method (IK treated hand-in-hand with scientific knowledge); and the integrationist method (ensure interlink between IK and SK). On the other hand, Tolbert (2015), Webber and Macfarlane (2017), as well as Crippen and Brown (2017) and others orchestrated studies on the role of indigenous knowledge in science teaching. The researchers share similar sentiments that indigenous knowledge provides a concrete basis for transformational teaching, educational inspiration, and intelligent and social growth. Furthermore, they agree that cultural information and learning experiences enhance the academic performance of learners. This suggests that agricultural sciences teachers may need professional development to implement IK and for proper incorporation into scientific knowledge (SK).

In the same light, Stripling et al. (2014) emphasise that teachers should possess outstanding knowledge obtained from indigenous people of a particular society. Therefore, to prepare agricultural education teachers for teaching agricultural concepts productively, the researchers used Dunkin and Biddle's (1974) model as a framework for agricultural concepts teaching in the classroom. This model was constructed on Mitzel's work (1960).

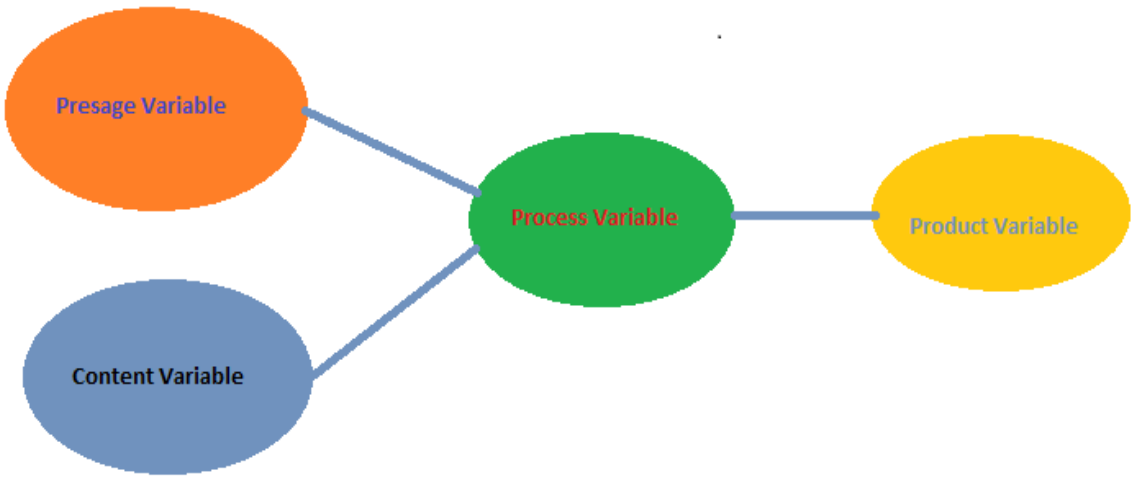

***Figure 3.2: Model for teaching agricultural sciences in the classroom*:** Source (Stripling et al., 2014, p. 24)

In a nutshell, Dunkin and Biddle's (1974) model describes that formative teacher experiences, teacher qualifications, and teacher characteristics (presage variable), as well as formative learner experience, community, and school (context variable), have a positive impact on process variables. Process variables are teaching activities (teacher) and learning activities (learner) that result in measurable or observable transformation, which can be positive or negative towards learners' behaviour or academic achievement. The teacher and learners' positive or negative attitude is referred to as a product variable (Stripling et al., 2014). This suggests that teachers should have agriculture knowledge that aligns with the agricultural sciences curriculum; teachers should be able to teach contextualised agriculture knowledge as seen in this curriculum. For proficient teaching of agricultural sciences, teachers have to possess an in-depth understanding of indigenous knowledge, which is dominated by the communal perspective.

Moreover, Mothwa (2011), Parmin, Sajidan, Ashadi, and Sutikno (2015), Parmini, Sajidan, Ashadi, Sutikno, and Fibrian (2017) and Baynes (2016) conducted studies related to teachers' attitudes to the inclusion of IK in various contexts. The above researchers concur that teachers have a positive attitude towards IK enactment, and understand the reasons for integrating local or cultural knowledge into the science curriculum. However, their primary challenge is to connect science and culture, since textbooks contain restricted content on IK. Teachers also lament the lack of knowledge on how and what knowledge to teach. Consequently, they are uncertain about integrating indigenous content, as they lack the proficiency to implement this realistically. This suggests that challenges brought about by lack of content on IK and the 'do-not-know-how' syndrome may result in teachers' inability to stipulate pertinent outcomes and relevant tools and the type of assessment appropriate for the lesson. Therefore, it is evident that intense professional development on IK integration is required, driven by a communal perspective.

The agricultural sciences CAPS document in South Africa stipulates that IK form the fundamental understanding of scientific concepts and the subject per se. However, it is silent about the content teachers have to disseminate to learners − how teachers should implement IK in the teaching of agricultural sciences. The agricultural sciences curriculum for Grade 10 offers the differences between IK and SK, together with the benefits and limitations of

IK. Grades 11 and 12 curricula have nothing denoted as IK content that must be taught. However, lack of IK content brings deficiencies to learners as they always attempt to respond with what they know from their societal experiences. Teachers become hesitant to accept such responses since textbooks lack indigenous knowledge that teachers should incorporate during teaching. This indicates that the incorporation of IK into agricultural sciences may fail if curriculum developers do not construct relevant IK content that must be addressed. It is evident in various studies conducted by Khoza (2013b, 2014a, 2015b, 2015c, 2019b) that learning outcomes drive a communal perspective.

3.2.2 Learning outcomes as the core principle

Learning outcomes are crucial in measuring knowledge, skills, capabilities, and values that learners have accumulated upon completing a term or grade (Allison, 2015; Donnely & Fitzmaurice, 2005; Idachaba, 2018; Kennedy et al., 2005; Khoza, 2016b; Koster, Schalekamp, & Meijerman, 2017; Stein et al., 2013). Scholars like Donnely and Fitzmaurice (2005), Kennedy et al. (2005), Kennedy, Hyland, and Ryan (2006), Khoza (2013b), Stupans, Atkinson, Mestrovic, Nash, and Rouse (2016), Hassan, Admodisastro, Kamaruddin, Baharom, and Che Pa (2016), as well as El Sheikh and Youssef Assaad (2018), share a similar view on learning outcomes. They concur that learning outcomes are a statement of what a learner is supposed to know, discern, and be capable of doing at the end of a learning phase. Learning outcomes place at the core what learners learn, rather than permitting them to replicate the actual content portrayed in the textbook (Kavitha, James, Harish, & Rajamani, 2018). Its focus is on what the learner attains at the end of the term, rather than how the learner attains such (Kennedy et al., 2005; Nakkeeran, Babu, Manimaran, & Gnanasivam, 2018). This indicates that a communal perspective steers learning outcomes. The communal perspective is related to social needs and learners' experiences or intents, therefore playing a unique role in the teaching process.

The crucial role of learning outcomes is attested to by the study conducted by Khoza (2014a). This study investigated the type of experiences students face in chemistry at a university in South Africa. Five first-year engineering students were selected via purposive and convenience sampling; one-on-one semi-structured interviews and document analysis were employed as data-production instruments. The results from document analysis showed that

the lesson planned had no intended learning outcomes, which were supposed to be observed and measured to ensure students' understanding. Therefore, students were passive. The lesson was teacher-centred and based on the lecturer's intents rather than students' intents. Jideani and Jideani (2012), Berkvens et al. (2014), as well as Khoza (2015a) aver that teachers should state learning outcomes before the lesson, so that learners may demonstrate such attainment at the end of the lesson. If teachers fail to state learning outcomes to learners before content presentation, learners may fail to cooperate during the lesson. Teachers may also experience challenges in assessing learners, since they may not observe and measure learners' understanding. However, this study was limited to only one university in South Africa and involved only five participants from one institution. This indicates a need for a study that may explore learners' experiences in using learning outcomes during the teaching of agricultural sciences in secondary schools from distinctive districts.

In addition, Kennedy et al. (2006), Pugsley (2010), as well as Broakway (2015) strongly maintain that there should be a connection between intended learning outcomes, teaching techniques, assessment strategies, and assessment criteria, to ensure that learning experiences are more precise and significant for learners. Bloom's taxonomy is therefore considered the most valuable aid to writing perfect intended learning outcomes (Bloom, 1956). Bloom's taxonomies allow teachers to assess learners effectively on lower, middle, and higher-order questions. The taxonomy addresses the cognitive domain (subject knowledge), psychomotor domain (skills), and affective domain (values or attitudes) (Bart & Lori, 2012; Kennedy et al., 2005; Khoza, 2013b, 2015b; Osler, 2013; Savic & Kashef, 2013; Sonmez, 2017). Since learning outcomes belong to a learner, Khoza (2016b) highlights that the formation of learning outcomes that assess learners' knowledge capacity can be measured using keywords applicable to the right-hand side of Bloom's cognitive level of outcomes. See Figure 3.3, which depicts the arrangement of key words in their

hierarchical order; and Table 3.1 displays the action verbs that can be used for each key word.

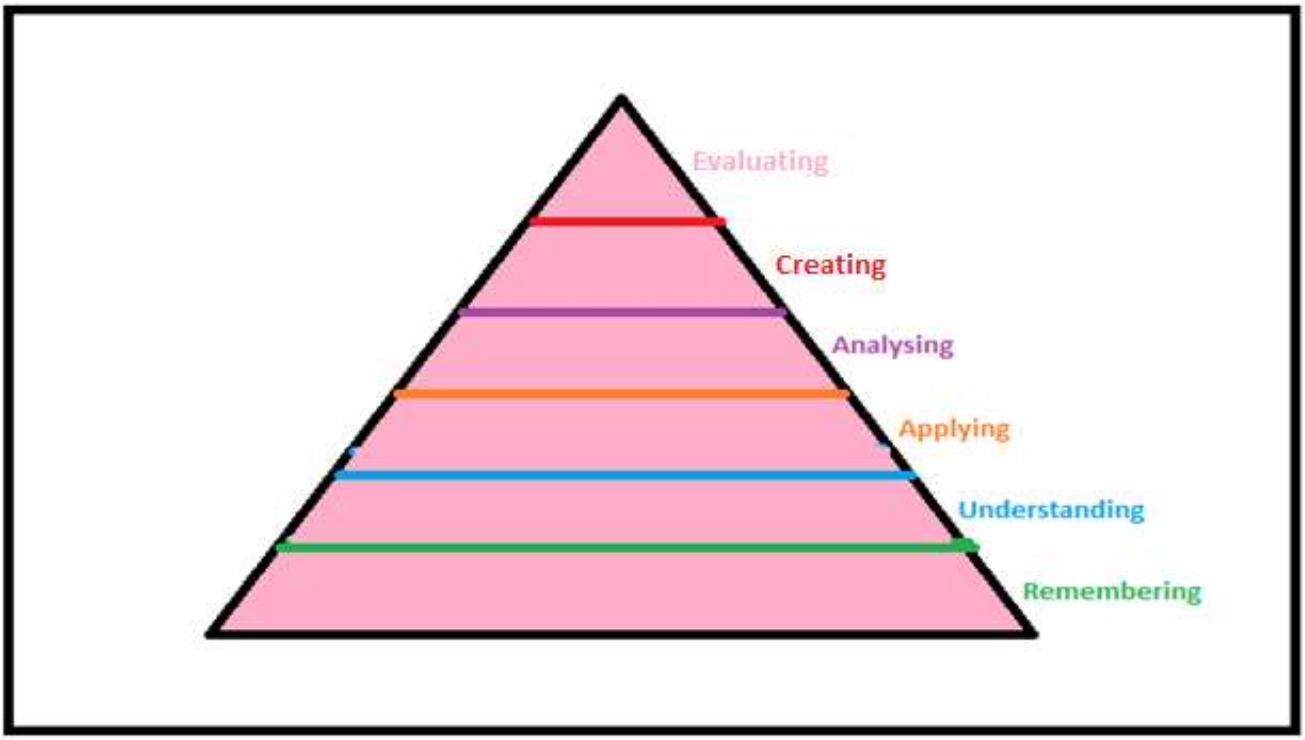

Figure 3.3: Bloom's Taxonomy for Cognitive Domain Levels (Khoza, 2016b)

Table 3.1: Cognitive Key Words and Action Verbs (Kennedy et al., 2006; Khoza, 2016b)

COGNITIVE DOMAIN LEVELS	***ACTION VERBS***
1. Knowledge Learners' capability of regurgitating specific content without understanding it.	List, show, define, order, name, repeat, identify, produce, outline, label, arrange, describe, find, state collect, tell, present, recognise, memorise, record, recall, tabulate, quote, duplicate, recount, examine, order, relate, enumerate.
2. Understanding Learners' capability of discerning and interpreting content taught.	Locate, report, solve, explain, decode, indicate, estimate, differentiate, discuss, associate, recognise, interpret, convert,

	restate, defend, construct, clarify, report, infer, express, discriminate, rewrite, contrast, distinguish, extend, change, generalise, paraphrase, classify, translate, predict, describe, review, select, illustrate.
3. Applying Learners' capability of applying content taught in various situations.	Sketch, schedule, employ, compute, apply, choose, manipulate, illustrate, modify, select, experiment, assess, practice, transfer, examine, demonstrate, organise, construct, find, predict, relate, calculate, develop, use, show, discover, interpret, solve, operate, prepare, complete, change, produce, dramatise.
4. Analysing Learners' capability of breaking down content into components to discover interrelationships.	Discriminate, point out, illustrate, criticise, analyse, Categorise, divide, separate, identify, determine, Compare, deduce, appraise, examine, distinguish, inspect, calculate, question, connect, experiment, relate, contrast, arrange, sub-divide, infer, investigate, break down, order, differentiate, test, debate, outline, classify.
5. Creating Learners' capabilities of assembling parts.	Invent, compose, originate, revise, manage, create, argue, develop, reconstruct, generalise, set up, make, formulate, construct, compile, device, assemble, plan, reorganise, explain, summarise, modify, establish, categorise, propose, arrange, rewrite, generate, design, prepare, collect.

6. Evaluating Learners' capability of judging the value of content for a provided purpose.	Measure, evaluate, conclude, decide, convince, Justify, argue, criticise, predict, assess, contrast, appraise, judge, ascertain, rate, compare, interpret, recommend, attach, defend, choose, resolve, grade, explain.

The above suggests that, for adequate assessment of knowledge attained by learners, agricultural sciences teachers should construct learning outcomes using the right-hand side key words as depicted in Bloom's taxonomies. Each key word is accompanied by action verbs that may assist teachers in formulating learning outcomes appropriately, directing the lesson towards learners' intentions rather than towards teachers' intentions. However, to observe and measure knowledge effectively, teachers should state the learning outcomes before the lesson, and they should note that each learning outcome starts with the action verb (Kennedy et al., 2005, 2006). For example: *Define the following terms: gene, homozygous, heterozygous, genotype, and phenotype* (knowledge). *Differentiate between monohybrid and dihybrid crossing* (understanding). *Calculate the coefficient of digestibility of the feed* (applying) *and interpret the answer* (evaluating).

Furthermore, the affective domains consist of their levels and action verbs teachers can use to formulate learning outcomes (Kennedy et al., 2005, 2006; Sonmez, 2017). See Figure 3.4 below, which depicts affective domain levels, and Table 3.2 that shows key words and action verbs.

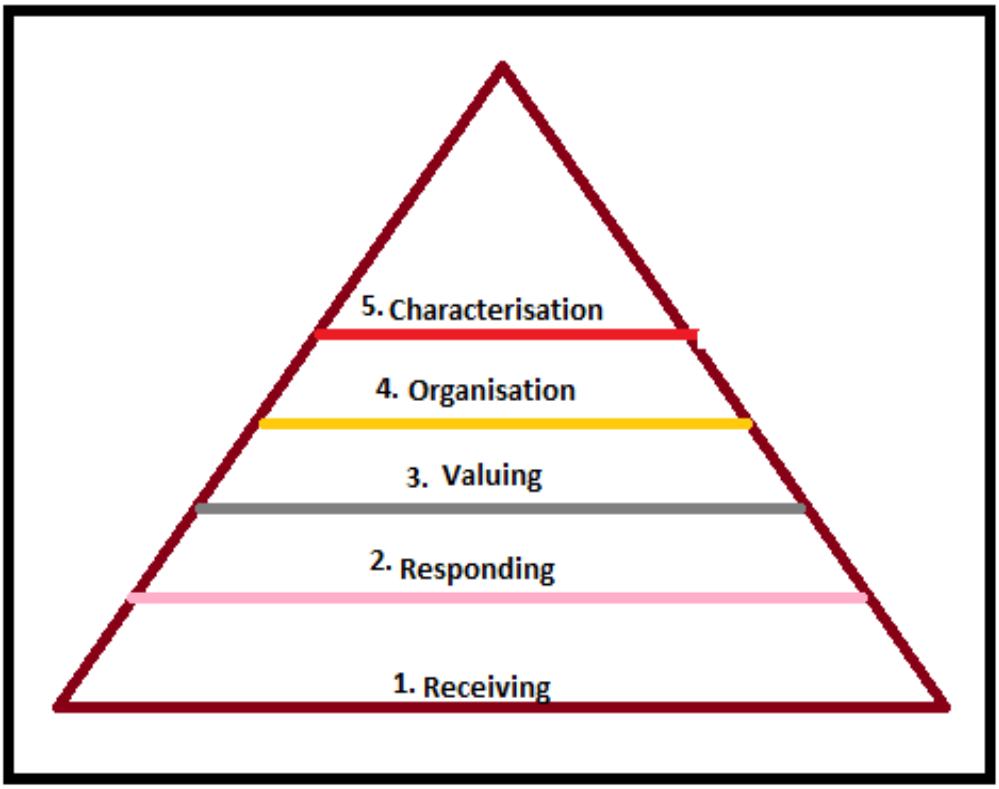

Figure 3.4: Taxonomy for Affective Domain Levels (Kennedy et al., 2006; Sonmez, 2017)

Table 3.2: Affective Key Words and Action Verbs (Kennedy et al., 2006; Sonmez, 2017)

AFFECTIVE DOMAIN LEVELS	***ACTION VERBS***
1. Receiving A learner admits the necessity for an obligation to service, pay attention, or listen to other learners.	combine, attempt, answer, appreciate, adhere, act, accept, ask, assist, challenge, conform, defend, complete, cooperate, demonstrate a belief in, display, embrace, initiate, discuss, dispute, hold, follow, justify,
2. Responding A learner displays interest in the discipline; is enthusiastic about presenting and partaking in classroom discussions; and enjoys assisting other learners.	
3. Valuing A learner exhibits attitudes towards democratic procedures; values or appreciates the pivotal role played	

by science in our daily lives; displays compassion towards other learners and cultural disparities.	organise, practice, integrate, order, listen, participate, judge, relate, share, synthesise, share, join, question, praise, resolve, report, value, support
4. Organisation A learner acknowledges the necessity for stability between freedom and obligation in a democracy; admits to accountability for own conduct; familiarises conduct to a value system.	
5. Characterisation A learner demonstrates self-reliance in working Independently; and displays good personal, social, and profound adjustment.	

The above reflects that the affective domain is mainly for developing learners' interest in agricultural sciences in order for learners to value and accept information from others, showing respect, while admiring individual cultural differences. This suggests that it is of crucial importance that learners display positive attitudes and appreciation towards the role of agricultural sciences in their everyday lives. Therefore, teachers should formulate learning outcomes that are embedded in learners' emotions or attitudes. Teachers should adhere to relevant key words and action verbs to formulate such learning outcomes. For example, *accept the requirement for food security in South Africa* (receiving). *Value the importance of genetic modification* (valuing). *Embrace the full responsibility of taking care of the soil, plants, and animals* (responding).

Moreover, the psychomotor domain has its levels and action verbs teachers can utilise to develop learning outcomes and specific skills (Kennedy et al., 2005, 2006; Sonmez, 2017). See Figure 3.5 below, which presents psychomotor domain levels, and Table 3.3 that outlines key words and action verbs.

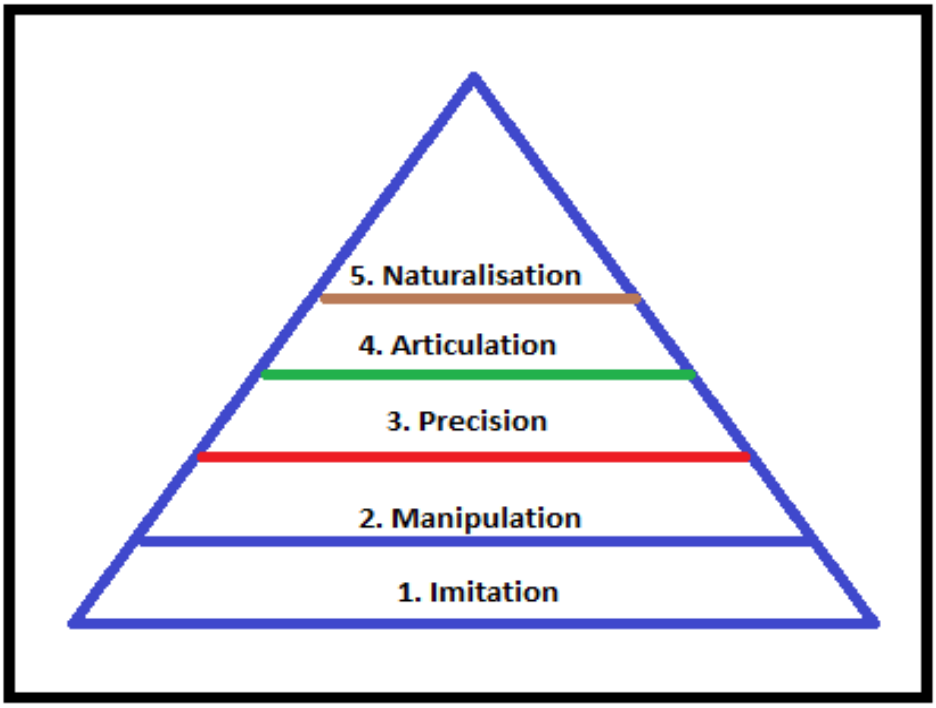

Figure 3.5: Taxonomy for psychomotor domain levels (Kennedy et al., 2006; Sonmez, 2017)

Table 3.3 Psychomotor Key Words and Action Verbs (Kennedy et al., 2006; Sonmez, 2017)

PSYCHOMOTOR DOMAIN LEVELS	***ACTION VERBS***
. ***Imitation*** A learner can observe the behaviour of another person and copy that behaviour.	Alter, administer, adjust, adapt, balance, assemble, arrange, choreograph, calibrate, build, bend, design, copy, construct, combine, demonstrate, detect, deliver, dismantle, differentiate by touch,
. ***Manipulation*** A learner can act or perform particular actions by following given instructions and practising skills.	
. ***Precision***	

A learner can complete a task, albeit with minor mistakes and can become extra accurate without copying from the source.	estimate, drive, dissect, display, grind, grasp, fix, execute, examine, identify, manipulate, heat, handle, mix, mimic, mime, mend, measure, skilfully perform, organise, operate, sketch, refine, record, present, use, react
• ***Articulation*** A learner can coordinate a sequence of actions by linking two or more skills.	
• ***Naturalisation*** A learner can link skills in their sequential order while consistently performing with ease.	

The above suggests that in agricultural sciences the psychomotor domain is of paramount importance. Its focus is on physical skills that may enable learners to contribute to the South African economy. Physical skills may permit learners to be competent in the world of work, or in changing the community. The formulation of learning outcomes in this domain relies on the key words mentioned above, together with action verbs. For example, *dissect and identify various organs involved in a fowl/chicken* (precision). *Build a cow model* (manipulation) *and sketch the flow diagram showing the process of food digestion* (articulation). In agricultural sciences, Bloom's taxonomies are of paramount importance in capacitating learners with adequate knowledge, skills, and attitudes. For instance, teachers may be able to formulate learning outcomes that may be observable and measurable at the end of the lesson. Teachers must ensure that learning outcomes are in line with the teaching tools, teaching activities, and assessment. In addition, formulating learning outcomes using Bloom's taxonomy levels may improve learners' academic achievement while developing their interest in the subject and inculcating relevant agricultural sciences skills that learners may apply in their everyday lives.

In South Africa, the agricultural sciences CAPS document is vocal about teachers' ability to capacitate learners with competent knowledge, skills, and attitudes, but silent on how this may be achieved by teachers. This declares the agricultural sciences curriculum vulnerable, since its emphasis is on content, which is disseminated without proficient learning outcomes and specific skills. Nevertheless, without learners' positive attitudes towards the subject,

learners may perform poorly, and they may fail to apply knowledge gained from school to the world of work. Therefore, curriculum developers should reconsider the inclusion of Bloom's taxonomies for assessing knowledge, skills, and attitudes in the South African agricultural sciences CAPS document. Teachers dominated by a communal perspective are usually driven by software tools (Khoza, 2019).

3.2.3 Software tools are utilised during agricultural sciences teaching

Software (SW) tools carry data to be shown on the HW tools to communicate learning. These tools can be seen but may be intangible (Khoza, 2012, 2014a, 2015a, 2015c, 2016a, 2017b, 2018). In most of the studies conducted by Khoza, examples of software tools are stated as overhead projector transparencies, PowerPoint slides, CD, DVD, YouTube, Facebook, e-books, Google, Yahoo, emails, Microsoft Office, and websites. Furthermore, Alabdulkareem (2015) and Vural (2015) add Twitter, Wikipedia, WhatsApp, Telegram, and Instagram as software tool examples. On the one hand, Makumane (2018) postulates that software tools are applicable as online software (can be seen but intangible); and that offline software tools can be seen and are tangible. On the other hand, Budden (2017) postulates that software tools are classified into synchronous teaching in which teaching is incorporated into *real-time*, using the internet, audio- and video-conferencing, and PowerPoint presentations. Asynchronous teaching in which teaching connects to the *time-delayed* abilities of the internet and utilising email, discussion forums, newsgroups, and file attachments.

Amory (2012), Khoza (2012), Eke, Omekwu, and Odoh (2014), Alabdulkareem (2015), and Budden (2017) are of the view that software tools are for socialisation, sharing of cultural knowledge and content. The role of these tools is to bring new opportunities for improving and increasing teaching and learning experiences. Alabdulkareem (2015) argues that teachers can teach learners better in informal learning conditions, utilising what is accessible to learners' hands to construct a significant learning experience in informal teaching. Therefore, the above researcher conducted a study on Saudi middle school teachers and learners to investigate the use of software tools in teaching and learning science, and its impact on teachers and learners in Saudi. This survey study involved 63 science teachers. Some 782 learners were selected randomly, and closed-ended questionnaire questions with 46 statements were used as data-generation methods. The results showed that both teachers

and learners have a great interest in using software tools in the teaching process. They believe that these tools can improve their educational experiences. However, the use of these tools is substantially low, as teachers lack an educational understanding of how to infuse social interaction into their teaching. As a result, this study recommends a need for training to evaluate the software tools' use, improving the capability of utilising accessible tools. This indicates a need for studies to explore the type of software tools available in secondary schools, and teachers' experiences in using software tools in schools.

Nevertheless, Eke et al. (2014), Vural (2015), and others conducted various studies on using software tools in higher education. It was evident from their results that software tools have both positive and negative influences. According to Eke et al., software tools improve teachers' teaching and discuss various topics, share ideas, and exchange files and pictures with other teachers worldwide. However, the use of password security is an essential part of an endorsed security policy. Vural (2015) asserts that teachers should be aware of the negative aspects of software tools, which can be eradicated using suitable cooperative teaching methods. On the contrary, Buchs et al. (2017) conducted a study on implementing cooperative teaching in elementary school teachers. The results showed that teachers have challenges with the use of a suitable cooperative teaching method. This then indicates a need for a study to explore agricultural sciences teachers' experiences using suitable cooperative teaching methods.

In the same light, software tools complement intended instructional tasks, improving outcomes, social knowledge and skills simplifying teaching by supporting cooperation, various cultural knowledge, and skills development necessary in the world of work (Eke et al., 2014). However, there is a gap in existing literature, since more studies on software tools are based on higher education. Even Budden (2017) highlighted this issue in his study. The researcher explored aspects that enlighten students of curriculum studies utilising e-resources at one of the South African higher institutions.

Above all, scholars like Mtega, Bernard, Msungu, and Sanare (2012), Dooley and Murphy (2013), Coley, Warner, Stair, Flowers, and Croom (2015), Adeyoyin, Idowu, and Sowole

(2016), Sanga, Mlozi, Haug, and Tumbo (2016) and Moakofhi, Leteane, Phiri, Pholele, and Sebalatlheng (2017) conducted studies addressing the use of software tools in various contexts at distinctive agricultural universities. Their studies concur that emails, chats, websites, the internet, social networks, overhead transparency projectors, digital audio, video conferencing, search engines, bulletin boards, electronic journals, and CD-ROM are software tools virtually employed during the teaching of agricultural sciences. Teachers justified that software tools stimulate interactive and cooperative teaching and improve assessment during the teaching process. In addition, these tools increased teachers' performance in agricultural sciences, and allowed sharing of ideas from various contexts at any time.

A communal perspective therefore influences software tools and teaching focus on opinions or ideas to address social needs. The use of software tools may provide agricultural sciences with a social space to share ideas and opinions that may bring change to the practice of agricultural sciences. In addition, software tools may encourage knowledge sharing to learners, which is applicable in various contexts. These tools may encourage teachers to formulate teaching activities that may motivate learners to bring horizontal knowledge through their social experiences, regardless of their status.

However, the South African agricultural sciences CAPS is reserved or silent about software tools teachers should use during the teaching process. Teachers seem to assume that certain software tools are suitable for the teaching process. Their assumptions may lead to selecting tools that limit learners from achieving learning outcomes. For instance, teachers may select tools that address teachers' intentions rather than learners' intentions. Consequently, the absence of software tools indicates a gap in the South African agricultural sciences curriculum. Teachers may employ incorrect tools to demarcate social interactions. Therefore, curriculum developers have to recognise the pivotal role of software tools in the teaching of agricultural sciences, providing software tools that teachers should use in secondary schools. Teachers are driven by the communal perspective when they act as facilitators during the teaching process (Khoza, 2017b; Mpungose, 2020b).

3.2.4 Facilitator actions during agricultural sciences teaching process

Barraket (2005) and 'Mpungose (2016b) claim that the facilitator directs learners' knowledge by giving them activities to construct content they learn during the teaching process. At the same time, Mabuza (2018) articulates that the facilitator can act differently in the classroom. For example, he or she can be a broadcaster facilitator (knowledge transmitter), an invisible facilitator (not transmitting nor guiding but neutral), a proficient facilitator (advisor during teaching process) or a spearheader facilitator (controlling discussions). This suggests the prominence of proficient facilitators as pillars of the communal perspective. Thus, Mabuza (2018) describes the proficient facilitator as the advice-giver that helps with discipline issues without intervening or controlling learners' discussions.

In this case, one of the facilitator's actions is to facilitate teaching by making a welcoming environment for learners to reflect on and create meaning from their daily life experiences (Kolb, 2014). Kolb further avers that this type of facilitator ensures that learners take full responsibility for the lesson, being non-judgemental and appreciating and admiring learners and their inputs. In the teaching of agricultural sciences (AGRIS), the proficient facilitator has explicit content to teach and still explains the procedure through which learning occurs, nevertheless utilises processes that are structured to lead the learners in finding the significance of the learning for their reality and the world of work (Cano, 2003). This view is also attested to by Ameyam, Turnhout, Arts, and Wals (2017) who claim that a proficient facilitator permits learners to control the lesson process, connecting it to problems existing in the society and the workforce. This suggests that the facilitator encourages learners to employ their decision-making and judgemental abilities by using their knowledge rather than the teacher's knowledge.

The facilitator action has been discussed and elaborated on by various scholars in the field of agriculture such as Karami, Zamani, and Zarafshani (2003), Pavelock and Ullrich (2003), Juilfs (2003), as well as Grant (2003). Karami et al. are of the view that AGRIS teachers have to hand over the chalk to learners to facilitate the teaching process effectively instead of concentrating on instructing subject matter. At the same time, Pavelock and Ullrich (2003) accentuate that this discipline includes problem-solving, hypothesis, and research. Therefore, facilitators should adhere to Bloom's taxonomies to activate learners' capabilities

to utilise reason and think theoretically. Furthermore, according to Juilfs (2003) a successful facilitator is learner-centred, employs knowledge acquired from each learner, linking it with content-centred anticipations to guide each learner proficiently. In the same light, Grant adds that the teacher-controlling responsibility declines in the learner-centred atmosphere. The pressure of being the source of content is alleviated as learners direct their tasks and the teacher guides in decisions about learning. However, none of the scholars has attempted to conduct any study regarding how agriculture teachers should facilitate their teaching process. I have not come across studies that have explored how teachers act during the facilitation of such lessons. This signifies a gap in the agriculture literature.

Thus AGRIS teachers should guide and facilitate learners' learning processes by adhering to various crucial aspects of teaching, as posited by Couso, Bestetti, Restini, and Romao (2015). For instance, as proficient facilitators, they should: 1) ask learners questions; and query and challenge the opinions that arise from learners' discussion; 2) acknowledge learners' ideas and ensure that opinions are vividly communicated; 3) improve learners' production of knowledge; 4) allow learners to evaluate data represented by their classmates; 5) provide frequent, beneficial feedback to learners on the learning process. In AGRIS, the facilitator's actions are driven by a communal perspective. This perspective permits the effective use of horizontal knowledge, which is dominated by learners' opinions. Therefore, facilitators are facilitating the addressing of society's needs rather than other needs.

In South Africa, the agricultural sciences CAPS document fails to specify how teachers should act during the teaching process. As a result, teachers have to act according to their discretion. This signifies that the AGRIS CAPS may fail: teachers may address other needs rather than the needs of their society. Teachers may ignore the pivotal role played by learners' experiences during the teaching process. Nevertheless, a communal perspective drives facilitator actions to introduce horizontal knowledge (Khoza, 2017b). When the teacher acts as a facilitator, the whole teaching process becomes dominated by a learner-centred method (Khoza, 2016b; Mpungose, 2020b).

3.2.5 Learner-centred method dominates during the teaching process

The methodology of instruction utilised by teachers during the enactment of any curriculum is of paramount importance, regardless of whether the curriculum is well structured or how accessible the teaching tools (Yalew, 2004). Alfassi (2004), Barraket (2005), Khoza (2013b, 2015b), Kalu-Uche, Alomina, and Ovute (2015), du Plessis (2016), Ige, Busari, and Ojo (2016b), and Deegan, Wims, and Pettit (2016) declare the learner-centred method is optimal for a communal perspective to address learners' and society's needs. The above researchers refer to this method as constructivism, wherein learners make their meaning and present their discernment. A learner-centred method "*is the method of instruction that is responsive, collaborative, problem-centred and democratic whereby learners decide how, and what to learn*" (Roman, 2015, p. 441). At the same time, it allows learners' active involvement and the ability to organise and design classroom activities pertinent to them to enhance their confidence (Tudor, 1993). In line with this, Yap, Neo, and Neo (2016), and McKim, Greenhaw, Redwine, and McCubbin (2017) refer to this teaching method as that in which learners use their interests and experiences while constructing unique individual discernment from active involvement with their social and physical milieu. On the other hand, Ige et al. (2016b) emphasise that agriculture is a field of science, which AGRIS teachers can successfully teach if they adopt a learner-centred method rather than any other method.

Kalu-Uche et al. (2015) conducted a study to examine pedagogical methods used by River State science teachers. The teachers were either constructivists or transmissionists. Participants were 31 science teachers who were selected randomly in River State areas. Observations and checklists were used as data-production methods. The study concluded that science teachers employ more transmissionist practices. Their findings recommended that science teachers undergo workshops that effectively enable them to employ a learner-centred method in their teaching practice. Likewise, Yalew (2004) and du Plessis (2016) investigated teachers' beliefs and their knowledge of the learner-centred method. The results showed that teachers are mainly utilising a teacher-centred method of teaching. Du Plessis (2016) concluded that their acquaintances influenced their teacher beliefs on the teacher-centred method while they were at school and in teacher training programmes. It is evident from the above studies that tertiary institutions have failed to teach teachers to implement the learner-centred method in their practice. Therefore, this indicates a need for studies to

explore lecturers' beliefs on the learner-centred method. Such a study should concentrate on various contexts.

According to Dowdy, Burgess, and Boyd (2017, p. 1) "*learner-centred teaching translates well between content and field immersions and can positively support the cultural and community wealth while affirming and deepening our appreciation of the local natural world*." Mtika and Gates (2010) believe that the learner-centred method resonates with aspirations to provide learners with pertinent capabilities of innovative cleverness, critical thinking, and problem-solving skills. For this reason Ige et al. (2016) argue that the AGRIS curriculum developers should incorporate agriculture experiences into the curriculum content offered in secondary schools, such being pertinent to learners' and society's needs. Figure 3.6 below presents the principles of the learner-centred method as posited by (Roman, 2015).

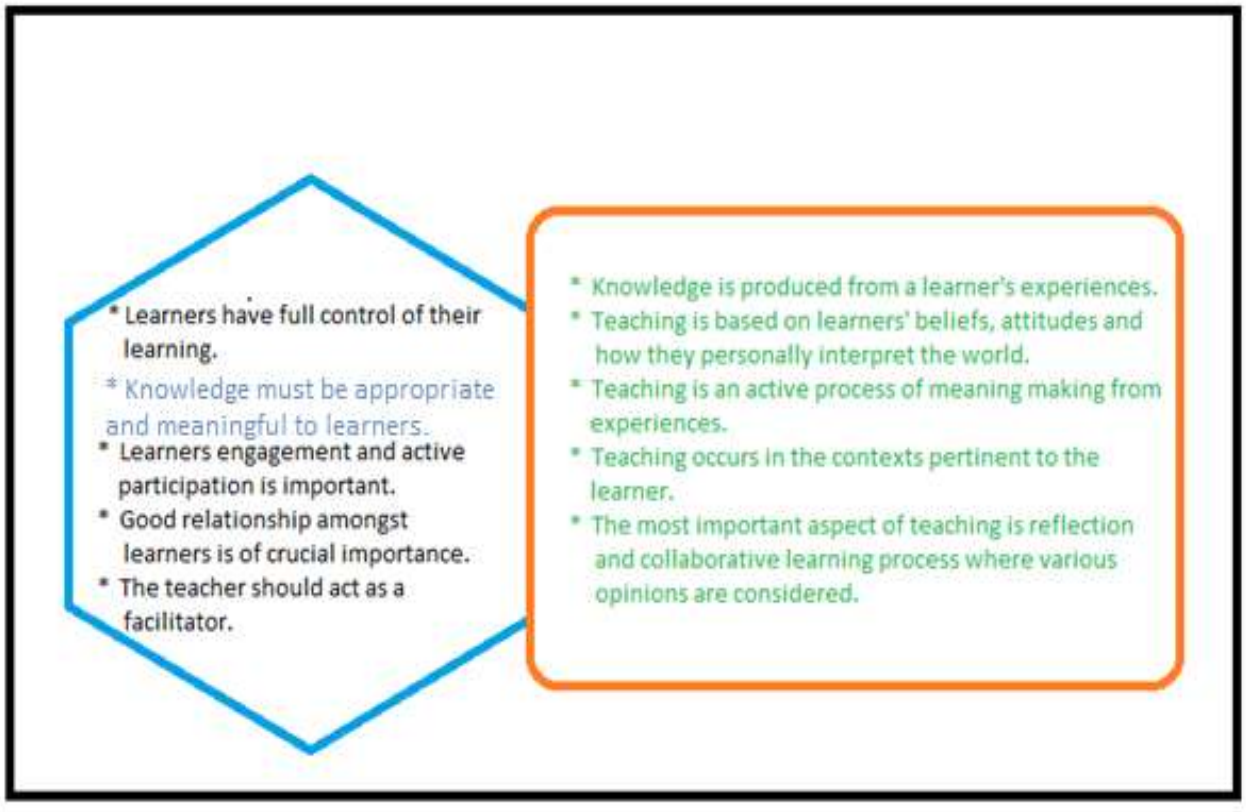

Figure 3.6: Principles of the learner-centred method (Roman, 2015)

The above principles provide in-depth understanding by clarifying what AGRIS teachers should bear in mind when enacting the learner-centred method: 1. Learners have complete control of their learning (the teacher should be more of a spectator while learners take full

responsibility for their learning); 2. Knowledge must be appropriate and meaningful to learners (learners' experiences should drive teachers' activities to generate their content effectively; 3. Learners' engagement and active participation are essential (learners are transformed from passive to active participants); 4. Good relationships amongst learners are crucial (learners should work with one another respectfully and collaboratively); and 5. The teacher should act as a facilitator (under no circumstances should a teacher act differently other than facilitating learning). This suggests that an AGRIS teacher should possess adequate knowledge of learners and their context, for effective enactment of this method. Primarily, at the end of the teaching, the teacher should reflect on and collaborate with the learning process by considering all the ideas shared by learners.

Furthermore, besides knowing the above principles, Yap et al. (2016, p. 267) evince that in learner-centred teaching: 1) Learners are aware of their learning outcomes; 2) Learners possess a wide range of learning techniques; 3) Learners are sure of when to utilise those strategies; 4) Learners can employ available tools most successfully; 5) Learners take full charge of their learning; 6) Learners have the skills to adapt to the learning processes, planning, observing, and evaluating; 7) Learners are capable of expressing their emotions appropriately; and 8) Learners are aware of their strength and weaknesses. Thus, AGRIS teachers should adhere to the principles mentioned above to enact the learner-centred method and understand their learners well. Furthermore, an AGRIS teacher should be an ongoing or life-long learner who is continuously focusing on the learner, guiding and facilitating the learning. Moreover, the teacher should stimulate learners' active involvement while enhancing learning through vigorous decision-making. In so doing, learners may introduce horizontal knowledge to understand vertical knowledge better (Bernstein, 1999).

Moreover, scholars in the agricultural discipline (Brown*, 2003; Diise, Zakaria, & Mohammed, 2018; Kovacevic & Akbarov, 2016; Mavhunga & Rollnick, 2015; Rubenstein & Thoron, 2015) conducted various studies on the learner-centred method. In their study to determine aspects conducive to supervised agricultural experience (SAE), Rubenstein and Thoron (2015) declare that the learner-centred method takes from the constructivism theory, which states that learners should embark on a meaning-making process to construct knowledge. The above researchers further posit that, during learner-centred teaching,

learners draw on various experiences to make meaning from various contexts. In addition, Kovacevic and Akbarov (2016) state that learners' experiences are of significance to this method, being driven by the belief that every individual has an infinite ability for personal growth. Thus, outcomes are measured by self-evaluation, followed by productive feedback from the teacher and other classmates. This suggests that AGRIS teachers should ensure that during learner-centred teaching learners' experiences and social knowledge remain dominant. Note that horizontal knowledge is in line with the competency-based curriculum, driving learner-centred teaching.

In the same light, the study that was orchestrated by Diise et al. (2018) on challenges of effectively implementing the learner-centred method for agricultural sciences learners exhibited that teachers provide irrelevant and meaningless questions to learners. For example, questions exclude learners' reality, interests, and environment, and real-life experiences. Mavhunga and Rollnick (2015) believe that teachers need to possess relevant knowledge for successful learner-centredness. However, their study investigating teacher beliefs related to teaching science showed that teachers tend to choose other methods owing to restricted knowledge of how to practise the learner-centred method. In addition, Opolot, Isubikalu, Obaa, Ebanyat, and Okello (2017) investigated how lecturers employ various teaching practices to produce quality students. The study concluded that agricultural sciences graduates obtain excellent results but show restricted effectiveness in influencing societal development. This suggests that lecturers are utilising other teaching methods that limit learners from making meaning from their experiences. Lecturers seem to promote other domains rather than stimulating affective and psychomotor domains. This indicates a need for better designed professional development workshops on the learner-centred method. Such should be conducted for higher education lecturers and secondary school teachers.

The AGRIS CAPS in South Africa has no theory underpinning any teaching methods, and it does not stipulate the use of affective and psychomotor domains during the teaching process. Consequently, teachers may select methods that only develop learners' cognitive levels, omitting those hidden to them. Therefore, AGRIS CAPS in SA may not succeed, and teachers may continually produce learners who fail to apply knowledge gained from school when they enter the workforce. This indicates a need for curriculum developers to review

the AGRIS CAPS document, restructuring it to enable teachers to produce learners also capacitated with skills and attitudes or values. When the teacher uses the learner-centred method during the teaching process, peer assessment is employed to assess learners (Khoza, 2016b; Mpungose, 2019b).

3.2.6 Peer assessment (assessment as learning)

According to Maba (2017), Maba and Mantra (2017), and Panadero and Brown (2017), it is pivotal for any curriculum to embrace social assessment in order to address social aspects. Peer assessment tends to be one of the assessment methods teachers have to use in this regard. However, scholars like Khoza (2015b, 2015c, 2017b, 2018), Kennedy et al. (2006), Mabuza (2018), and Kisaka-Jwan (2019) refer to peer assessment as assessment as learning, it being dominated by opinions that mainly address social needs. Kulkarni et al. (2013), Harrisson, O'Hara, and McNamara (2015), and Mpungose (2018) are of the same view as Maba (2017) in affirming that peer assessment has to do with learners assessing other learners' work, using the preordained criteria. Such peer review is powerful and capable of addressing social matters. The above researchers further aver that peer assessment is viable in meeting learners' current needs without jeopardising learners' capability of meeting their future needs. Peer assessment has less to do with teachers' knowledge. However, AGRIS teachers should consider that peer assessment promotes sharing of opinions; therefore, they may prepare rubrics for the tasks given to learners. Teachers may avoid giving learners prescribed answers to mark their peers' work. It is therefore vital to understand the meaning of peer assessment.

Peer assessment is "*an arrangement in which individuals consider the amount, level, worth, quality or success of the products or outcomes of learning of peers of similar status*" (Hung, Chen, & Samuelson, 2016; Li et al., 2016; Lu, 2018; O'Flaherty, 2015; Panade**r**o, 2016; Panadero, Jonsson, & Strijbos, 2016, p. 8; Topping, 1998; Topping*, 2009). At the same time, Black-, Lee, Harrison, and Marshall (2004), Reinholz (2016), and Yu and Sung (2016) view peer assessment as activities undertaken by learners to provide judgement and constructive criticism feedback to other learners on their work. Panadero et al. (2016) postulate that peer assessment is rooted in Vygotsky's practice. This practice emphasises

that learners evolve their skills in a milieu in which they can view and imitate others. The researchers further claim that this type of assessment is in line with Vygotsky's principle of the zone of proximal development (ZPD), which describes what learners can accomplish with some scaffolding and assistance from other learners. Panadero (2016) adds that peer assessment includes numerous social factors, which generate opinions and activities resulting from the collaboration of assessors from the same school. Peer assessment has to do with social acknowledgements and understanding, which may be influenced by background, contributing to society's evolvement. Therefore, this indicates that communal perspective drives peer assessment.

The importance of peer assessment is attested to by Singh, Lebar, Kepol, Rahman, and Mukhtar (2017) in exploring the contemporary assessment methods used by lecturers in various Malaysian higher institutions. Two institutions were selected, and 15 lecturers were participants. Pre-observation, observation, and video-recording were utilised to generate data. The study concluded that lecturers employ peer assessment as their mode of assessment. However, most of the studies conducted on peer assessment involve higher-education lecturers and students, internationally. This signifies a gap in the literature of further studies that might be conducted locally using teachers teaching in secondary schools.

Nonetheless, various scholars like Kulkarni et al. (2013), Harris, Brown, and Harnett (2015), Pereira*, Flores, and Niklasson (2016), Li et al. (2016), Rotsaert, Panadero, and Schellens (2018), Rotsaert*, Panadero, Schellens, and Raes (2018) and Lu (2018) have conducted various studies on the practice of peer assessment. These researchers believe that peer assessment promotes learners' active participation while enhancing cooperation and interaction and sharing opinions. This suggests that peer assessment gives learners the opportunity of displaying their discernment, incorporating opinions, and connecting their discernment, so as to clear all misconceptions.

On the contrary, Acar-Erdol and Yildizli (2018) conducted a study to identify assessment methods used by primary and secondary school teachers in Turkey. The results showed that teachers employ other forms of assessment rather than peer assessment. The study

recommends that teachers receive professional development on the importance of peer assessment during the teaching process. Therefore, teachers' inability to utilise peer assessment during the teaching process may hamper learners' capability of solving problems within their communities. Teachers may produce learners with adequate knowledge, which they may fail to apply in real-life situations to develop and improve society. Reinholz (2016) adopted the peer-assessment cycle from Sadler's (1989) and Kollar and Fischer's (2010) work to provide six activities that teachers should follow when enacting this type of assessment. Figure 3.7 below depicts the six activities involved in the peer assessment cycle.

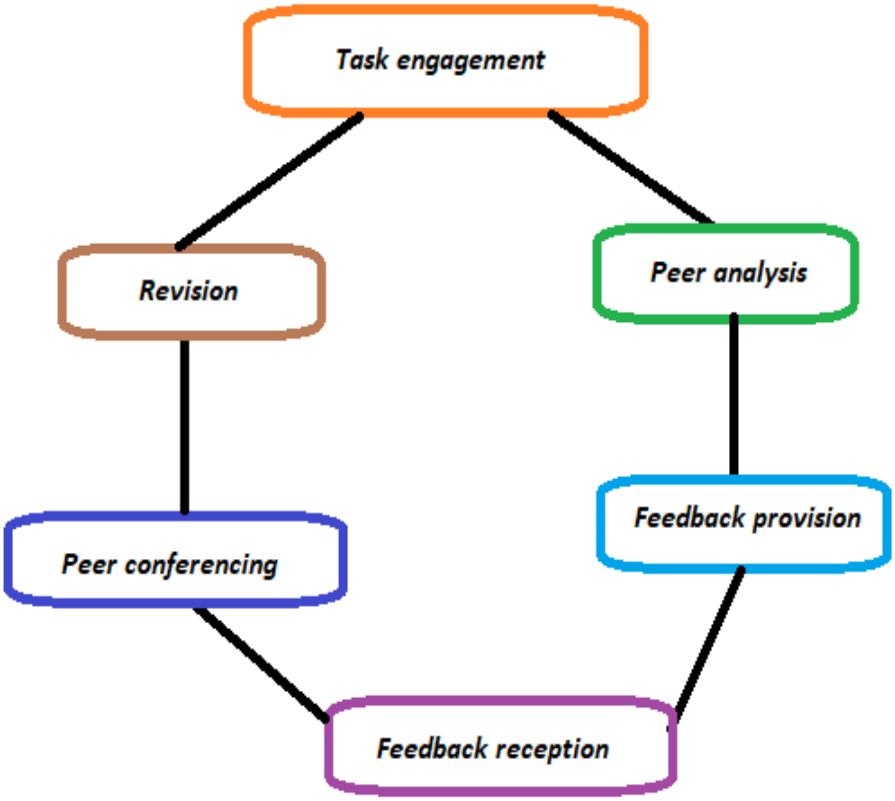

Figure 3.7: Peer assessment cycle (Reinholz, 2016, p. 305)

The above cycle suggests that six activities may characterise peer assessment: 1) Task engagement as the first activity in the cycle: learners start by engaging with a given task to solve a problem. However, the given task should be the same that learners will assess; 2) Peer analysis is the second activity that occurs after task engagement. This is where learners exchange their tasks and attempt to judge the quality of other learners' work to grade and provide constructive criticism; 3) Feedback provision is the third activity in which peers can give feedback in writing or verbal form. In this activity, learners provide a comprehensive analysis to their peers and become actively involved with this assessment; 4) Feedback reception is the fourth activity after learners have received feedback from their peers. This

activity serves as a revelation in which learners view their work differently, so that they may concentrate on those aspects that seem to be problematic to them; 5) Peer conferencing is the fifth activity, in which learners discuss their feedback verbally, sharing opinions and problems to a broader extent; and 6) Revision is the last activity that emanates from peer conferencing, enabling peers to revise and identify the gaps in their work, and therefore close the discussion. This suggests that peer assessment may promote communication and collaboration, resulting in an in-depth understanding of AGRIS concepts. Therefore, the communal perspective may enhance better enactment of peer assessment.

However, scholars like Topping (1998), O'Flaherty (2015), Adachi, Tai, and Dawson (2018), and others criticise peer assessment. For instance, they argue that learners who perform poorly may refuse to partake, and may resist accepting the feedback provided by their peers as correct. They further argue that learners might abuse the assessment process by providing unfair judgement. On the other hand, they claim that allowing learners to become assessors can hinder the power relationship between teachers and learners. This indicates the need for peer assessment studies that should be conducted locally using secondary school teachers. In addition, it seems that some scholars discuss peer assessment under the influence of other perspectives rather than from an habitual perspective. This on its own may create confusion over the enactment of this type of assessment.

Even the South African CAPS document is silent on how teachers should enact peer assessment. As a result, teachers might inappropriately employ peer assessment. For example, the teacher may give learners routine tests to write. Thereafter, learners may be asked to exchange their answer sheets and to follow the memorandum when marking their peers' scripts. Such action may symbolise another form of perspective that delimits the use of the communal perspective dominated by opinions. Teachers may utilise peer assessment to achieve their objectives while this type of assessment is in line with learners achieving learning outcomes. This indicates that AGRIS in South Africa may continue to utilise various assessment forms to equip learners with knowledge. However, curriculum developers may resolve this issue by providing an in-depth understanding of peer assessment enactment in the CAPS document. Mpungose (2019) and Khoza (2017b, 2018) posit that

teachers driven by a communal perspective usually prefer online learning to other forms of learning.

3.2.7 Online milieu and years as teaching time

Mpungose (2020b, 2020c) claims that the online milieu permits teachers and learners to communicate via various social media to share distinctive opinions on the subject. This suggests that the online milieu addresses learner and society needs, which is driven by a communal perspective and is in line with the competency-based curriculum. However, social knowledge generation, peer communication, and learner-centred discussions should dominate an online milieu (Bower & Kumar, 2015). The teacher presence is crucial in planning activities and facilitating new knowledge construction through social communication in the learners' population (Goldie, 2016; Skrypnyk, Joksimovic, Kovanovic, Gasevic, & Dawson, 2015). Sun and Chen (2016) add that, apart from facilitating learning, providing clear learning outcomes and feedback to learners is paramount in the online milieu.

According to McPherson and Bacow (2015), the online milieu includes various technologies for facilitating learning. At the same time, Adedeji, Nwokolo, Abimbola, and Kazeem (2017) and Rulashe and Nkonki (2017) share a similar view on the online milieu. Online learning becomes a teaching object to aid an effective teaching process in which learners and teachers construct new knowledge through employing digital technologies to collaborate global and local knowledge. Online learning also includes asynchronous or synchronous connections using various social media and teaching techniques (Reese, 2015; Roberts, 2009). The descriptor asynchronous implies teaching and learning that do not occur simultaneously, while synchronous teaching and learning occur simultaneously (Budden, 2014; Mpungose, 2020c; Sun & Chen, 2016). Furthermore, most secondary school learners are digital natives; the online milieu can permit better elasticity and independence for these users (Mitchell, Parlamis, & Claiborne, 2015).

In agriculture, the online milieu provides a significant element of competitiveness in the world's economy, with cumulative demands for an enormously skilful world of work (Agber

& Agwu, 2013). Agber and Agwu conducted a study to assess the use of the online milieu by lecturers teaching AGRIS in Nigeria (Benue state). Participants were 193 lecturers who were randomly chosen within six higher education institutions. A structured questionnaire was utilised to generate data. The study concluded that in an online milieu, lecturers only utilised videos, search engines, e-books, and e-journals. The researchers further revealed that AGRIS lecturers lacked experience in the usage of the online milieu. This suggests that AGRIS lecturers' inexperience may result in AGRIS teachers' inability to utilise the online milieu successfully in schools. However, this study was based on tertiary institution lecturers, not secondary school teachers, and was conducted in Nigeria using only one data-production method. This indicates a need for a local study to explore the use of the online milieu by AGRIS teachers in secondary schools. This anticipated study should involve data-generation methods that may answer what, how, and why AGRIS teachers use the online milieu in teaching the subject.

Further to the above, various scholars have conducted studies on the use of the online milieu. For instance, Jung (2005) study explored the contribution of the online milieu to teachers' professional development. Jung (2005) posits that using the online milieu is crucial to everyday teaching for most teachers. Its usage enhances unceasing professional development activities, associating teachers with more significant teaching societies, and permitting communication with knowledgeable or skilful clusters. Apart from being beneficial to teachers, in Bryant and Bates (2015) paper, it is stipulated that the online milieu enables learners to work collaboratively using distinctive social impacts and influences to create meaning from new knowledge. Such knowledge is constructed through communicating with other learners via social media and other online tools. This suggests that in AGRIS, the online milieu may be beneficial to both learners and teachers. For example, teachers may develop through interacting with various AGRIS experts within the global range. Moreover, learners enhance the effectiveness of their teachers by collaborating with learners from other countries to produce competent knowledge.

In addition, various scholars have lauded the benefits of being involved in the online milieu. For instance, Taiwo (2009) evaluated what teachers perceive as the role of the online milieu in Nigerian secondary schools, concluding that this milieu improves learners' learning as

they become actively involved. Further to this, the above researcher asserts that the online milieu is focusing on learner-centredness and constructivist teaching. In the same light, the study conducted by Baleni (2015) focused on how online formative assessment enhances teaching and learning, and how teachers and learners benefit from such assessment. The study expressed that, if the online milieu is properly applied, it can provide in-depth and instant feedback to both teachers and learners while enhancing production. Cheok, Wong, Ayub, and Mahmud (2017) conducted a study to explore Malaysian secondary school teachers' perceptions of the online milieu. This study concluded by proffering the advantages of using the online milieu: 1) enhancing learning outcomes and improving self-directed learning; 2) Promoting elasticity in learning, irrespective of place and time, and enhancing learner enthusiasm; 3) Providing excellent opportunities when these learners enter the workforce, learners being extra capacitated with required 21st century work abilities; 4) Providing practical knowledge for learners. This suggests that the online milieu may benefit AGRIS teaching only if the communal perspective dominates teachers.

Further to the above, Cheok et al.'s study exhibited limitations for enacting the online milieu: 1) Shortage of time for enactment; 2) Heavy work load, which hinders teachers from understanding this type of milieu; 3) Absence of training from the Department of Education; 4) Overcrowded classes, which complicates the enactment of the online environment; 5) Difficulty in handling the online milieu, learners having a habit of becoming distracted and visiting inappropriate websites. The technology acceptance model (TAM) was introduced to alleviate teachers from the challenges of enacting an online milieu. Figure 3.8 below presents TAM, Davis, Bagozzi, and Warshaw's work. (1989).

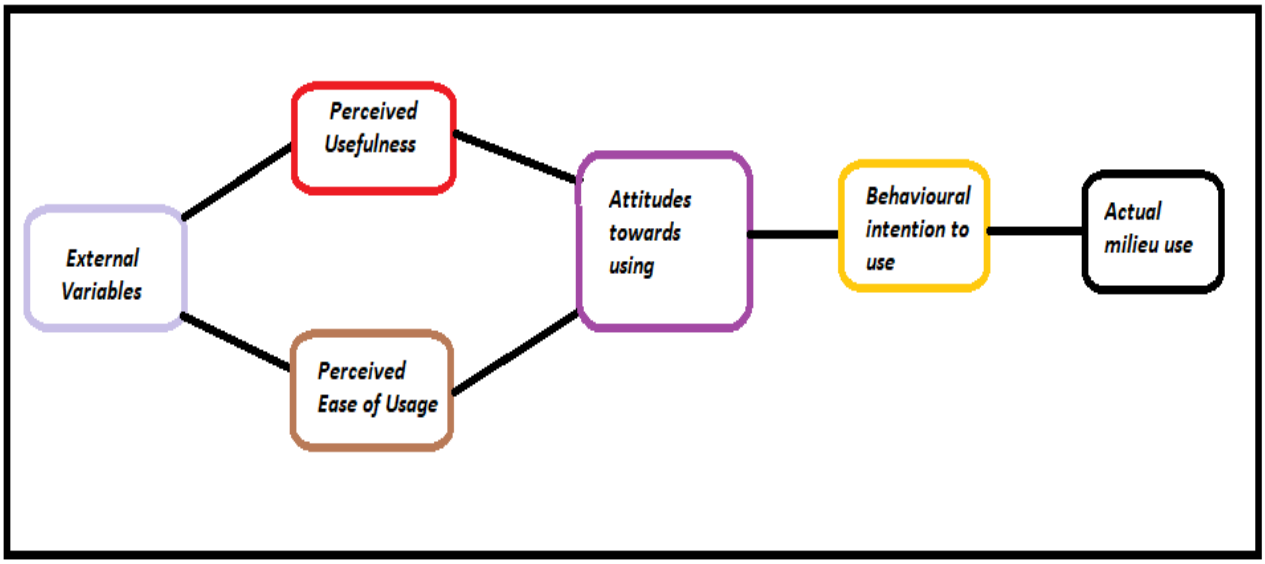

Figure 3.8: Technology Acceptance Model (Cheok et al. (2017, p. 21)

The above model outlines that, before enacting the online milieu, opinions from *external variables* are essential. This indicates that curriculum developers, teachers, and school principals should identify factors that may hinder the enactment of the online milieu; and factors that may assist in the enactment process before adopting such a type of milieu. Teachers' enthusiasm and encouragement can be described by perceived usefulness, ease of use, and attitudes towards the online milieu. AGRIS teachers' attitudes may decide whether they will agree or refuse to enact an online milieu. Teachers are not forced to enact the online milieu as it is not mentioned in the subject document. However, their attitudes may influence perceived usefulness and ease of use. When teachers believe that using the online milieu is easy, they may enact it, although inapplicable to the CAPS document.

In the South African AGRIS CAPS, nothing is stipulated about the use of the online milieu, and there is no theory underpinning this type of milieu. This suggests that teachers may be unable to enact such; thus, they may deviate to other forms of milieu familiar to them. This indicates that the CAPS may fail to address 21st-century skills that are a significant requirement in the job market. Teachers may continue producing learners with or without good grades who may never be competent in the workforce thanks to lack of skills. Therefore, this calls for curriculum developers to realise the importance and immediate need for the online milieu in AGRIS practice to effectively stipulate enactment guidelines on the

subject in the CAPS document, ensuring that the developers provide support for teachers. Teaching time must be viewed from a communal perspective.

A communal perspective is driven by a competency-based curriculum, in which the attainment of outcomes is of significance. This suggests that the teaching process might occur within a year, as long as a learner achieves specific learning outcomes. The time is determined by how learners learn, considering that they do not learn in the same way. Learning pace differs, and learners have different learning outcomes that they may achieve at various times. Consequently, their assessment focuses on what they know, regardless of the levels and how they achieve their outcomes. This implies that the communal perspective regards the pass/fail notion as dysfunctional as long as learners achieve outcomes, whether at different times or at the same time. In essence, the time is determined by the selection process, sequence, and pace (Hoadley & Jansen, 2012). This shows that learners have complete responsibility for selecting what they want to learn; they decide when to learn, what to select, and how fast to learn. Therefore, time in this perspective differs from others since the teaching process is not influenced by the set policies but by the milieu in which learners live and learn. However, time signifies a gap in the communal perspective literature − I have not found studies that address teaching time in the competency-based curriculum.

3.3 Conclusion of this Chapter

This chapter represented literature that provided an in-depth understanding of the communal perspective of teaching agricultural sciences in secondary schools. Furthermore, the chapter has delineated the communal perspective principles, which are driven by a competency-based curriculum. Therefore, this chapter revealed distinguishing principles, namely: indigenous knowledge, learning outcomes, software tools, facilitator actions, the learner-centred method, peer assessment, and the online milieu, together with teaching time. The succeeding chapter seeks to designate the theoretical framework that may serve as a framework on which to teach agricultural sciences in schools.

CHAPTER FOUR

PERSONALISING AGRICULTURAL SCIENCES PRACTICE

Figure 4.1: Chapter 4 Flow diagram

4.1 Introduction

Chapters Two and Three outlined the existing literature on prescriptive and communal perspective principles that teachers can employ during the teaching of AGRIS in secondary schools. At the same time, the chapter utilises the CHAT as a personalised lens through which to harmonise the literature provided in previous chapters (Two and Three). Furthermore, this theoretical lens is driven by an habitual perspective in which teachers' experiences are placed at the centre of their teaching practice. Thus, this chapter presents knowledge (scientific and indigenous), aims, ideological-ware, researcher actions, the teacher-centred method, the formative assessment, the blended milieu, and weeks as teaching time.

The above principles align with the cultural historical activity theory (CHAT); this study deemed CHAT the most appropriate lens. The CHAT involves culture, history, and activities, which are of significance to the teaching of AGRIS. In this instance, culture is viewed by Matusov and Marjanovic-Shane (2017, p. 307) as "*a particular stable way of acting, behaving, doing knowing, and mediating things and relating to and communicating with other people*." In the same light, Vasyakin, Ivleva, Pozharskaya, and Shcherbakova (2016, p. 11516) define culture as "*the company's social and spiritual field, shaped by material and non-material; visible and disguised; conscious, subconscious and unconscious processes; and phenomena that together determine the consonance of philosophy, ideology, values, problem-solving approaches and behavioural patterns of the company's personnel."* This indicates that the culture that is driven by the aspects mentioned by Vasyakin et al. (2016) may enable the success of any institution. However, Nurdiana, Mahmud, and Mansur (2019) view culture as the crucial paradigm in controlling people's attitudes, actions, and behaviour in a particular community. This view suggests that culture may enable the analysis of human actions during teaching practice, which occurs within the school setting. As stated by Vygosky (1978), human communication is discerned by utilising tools and artefacts. Thus, culture revolves around the history of a particular society.

History is the study of transformation and evolution in society over time. It allows in-depth comprehension of how human interactions of the past shape the present and affect the future (Black* & MacRaild, 2007). On the other hand, the Department of Education (2012) posits

that history is a process of inquiry, including critical thinking about stories that people tell about the past, together with modern stories. This suggests that history plays a crucial role in AGRIS, contributing to knowledge of the past, which is of paramount importance in understanding AGRIS content. Thus, AGRIS teachers belong to historical societies; therefore, cultural and historical aspects may enable them to formulate activities which transform learners − how they view the world − teaching a future compliant workforce. Therefore, AGRIS teaching may be an activity that revolves around cultural, historical, and social dimensions wherein society, tools, attitudes, and values have a remarkable impact on why teachers act in a particular way to fulfil their teaching intentions. Nevertheless, what is the connection between culture, history, and the CHAT?

Culture and history drive human activities. As a result, teachers possess unique habitual perspectives, acting according to distinctive cultural and historical backgrounds (Engestrom, Miettinen, & Punamaki, 1999; Kuutti, 1996). Thus, it is within a particular culture that teachers utilise various tools to formulate activities (Sannino & Engestrom, 2018). This account points to teachers being influenced by similar cultures therefore using the same tools for activities. Their historical background influences how they act, think, and perform tasks (Gretschel, Ramugondo, & Galvaan, 2015). Therefore, according to Koszalka and Wu (2004), the activities addressed by CHAT require in-depth discernment of personal history; analysing why teachers employ tools in a particular manner. Cultural and historical aspects stored subconsciously in the teacher's cognition contribute to the daily selection and utilisation of tools (Roth, 2007; Roth & Lee, 2007).

However, Hardman (2008) argues that the culture and history of utilising tools can be altered during the enactment of activities. This replacement of tools is owing to internal paradoxes that take place within individual teachers, and it is activated by a change in approach, knowledge, and the enactment of activities (Roth & Lee, 2007; Koszalka & Wu, 2004). For instance, AGRIS teachers may choose tools that are not driven by other perspectives (hardware and software) rather than ideological ware that is steered by the habitual perspective.

Scholars like Abdullah (2014) and Ward (2016) argue that internal paradoxes are part of the learning venture. Therefore, paradoxes stimulate teachers to transform their teaching practice. Thus, according to Engestrom (2000), appropriate attitudes to overcome internal contradictions can be comprehended through external activities brought about by the zone of proximal development (ZPD). In the CHAT, the ZPD occurs when an historically and culturally inclined expert provides proper guidance on how to formulate certain activities (Hardman, 2008; Yamagata-Lynch, 2007). This statement suggests that, in AGRIS, ZPD may occur if subject education specialists (SES) provide in-depth guidance on how teachers should infuse their experiences during the preparation of activities, suggesting how to select appropriate tools. The SES should provide ZPD by bringing in a personal identity without involving systematic and societal structures. Therefore, the type of guidance required should be driven by an habitual perspective. Further to this, the CHAT has its history, which makes it relevant to this study.

4.2 The CHAT Historical Overview and its Relevancy to this Study

Scholars like Foot (2001), Daniels (2004), Yamagata-Lynch (2007), Feldman and Weiss (2010), Nussbaumer (2012), Hasan and Kazlauskas (2014), Chizhik and Chizhik (2018), Francis and Hardman (2018), Mpungose- (2018), Kisaka-Jwan (2019) and others, share a similar view about the evolvement of CHAT. They acknowledge that the CHAT is the work of a psychologist from Russia by the name of Lev Vygotsky. However, Alexei Leont'ev and Yrjo Engestrom extended Vygotsky's work. For instance, Vygotsky (1978) created and introduced the first generation of the subject, tools, and object. Vygotsky's main intention was to uphold that human activities respond to and act upon facilitating objects and tools that can lead to an outcome. In this regard, Francis and Hardman (2018) highlight that Vygotsky's first-generation also explains human learning as the process that involves the mediation of tools to attain higher cognitive levels.

Furthermore, subject actions on an object (teacher's actions on knowledge) that exclude mediation of tools result in lower cognitive levels. This indicates that higher-order levels require to be mediated in order for the subject to attain the object effectively. Igira and Gregory (2009) and Yamagata-Lynch (2010) postulate that Lev Vygotsky emphasises that

mental consciousness is facilitated by cultural and historical activities using specific tools. Then Leont'ev develops the division of labour as the second generation in the CHAT.

Feldman and Weiss (2010) refer to the division of labour as the fundamental human activity since it clarifies what people are responsible for in social structures. At the same time, Foot (2001) asserts that division of labour is what people do to the object, involving horizontal division of duties and the vertical division of power. However, Engestrom (1987) argues that the subject, tools, object, and division of labour are inadequate to achieve an outcome if rules and community are not involved. Therefore, the rules and community were introduced into Vygotsky's Model as the third generation.

Rules and community as the third generation in the CHAT, display how rules intermediate the connections between the subject and the community and how the division of labour mediates between the community and the object (Nussbaumer, 2012; Francis & Hardman, 2018). Furthermore, rules control all actions of the subject toward an object and other members involved in the activity. By contrast, the community members share an interest in and involvement with the same object (Foot, 2001). In addition, Vygotsky (1978), Leont'ev (1978), and Engestrom (1987) share a similar view about the CHAT. They concur that the CHAT has to do with the conception that all activities are classified as cultural or social, in which the subject modifies or transforms an object. At the same time, an object is a cultural entity that evolves during human activity.

By comparison, the outcome of human activity results from the subject interrogating the object using tools that facilitate the interactions. The rules connect the subjects and community, while a division of labour mediates between the community and an object. This suggests that the CHAT is relevant for this study, since it involves the tools (teaching aids), subject (teachers and learners), object (knowledge), rules (assessment), community (environment), and division of labour (teaching approach). This suggests that the CHAT principles are pertinent in AGRIS practice.

4.2 Relevancy of the CHAT in this study

The CHAT leads to recognising fundamental principles that may assist in acquiring data contributing to in-depth discernment and quality description of AGRIS teachers' habitual perspective. This theory has the potential (Wolff-Michael & Yew-Jin, 2007) to overcome some of the most problems that have plagued AGRIS practice. For instance, currently, AGRIS practice seems to lack social drives and intents, yet AGRIS is social. It does not consider that teachers are creatures of habit. Individual teachers have a set of personalities that they live by, which originates from their social reality and, in turn, assists them to coordinate and structure their social relations. AGRIS practice seems to lack an understanding that teachers are the products of their history or past. Their actions are in line with distinctive social norms; and subsequently, teachers develop permanent personalities. This is attested to by Rybacki (2009) who postulates that teachers' habitual perspectives cannot be seen as distinct from their human activities. The CHAT shows why teachers teach in particular ways, bringing transformation to AGRIS practice.

Moreover, the CHAT in this study is employed as an habitual perspective and characterised by seven principles: *Ideological-ware* (tools) that the *researcher* (subject) can use during teaching and learning in order to deliver the *knowledge* (object), which may enable the attainment of the *aims* (outcomes). *Formative assessment* may be utilised by the researcher (as rules), while ensuring that the *blended milieu* (community) and the *teacher-centred method* (a division of labour) are enacted for effective teaching and learning. Therefore, Figure 4.2 below depicts the CHAT as personalised. A discussion of habitual perspective principles follows.

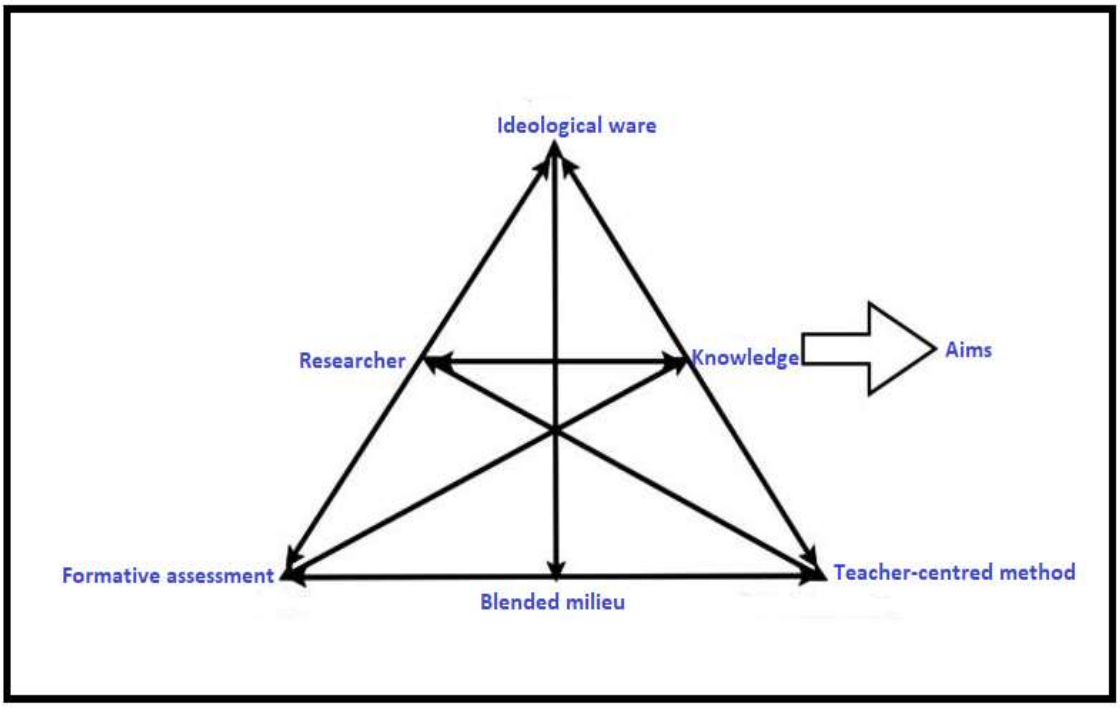

Figure 4.2: The habitual perspective principles drive the personalised CHAT

4.3 Habitual perspective in AGRIS

An habitual perspective places individual uniqueness (teacher/learner) at the core of teaching, to help the teacher and learner to create personal identities (Khoza, 2015a, 2016a, 2017b; Mpungose-, 2018). At the same time, Ngubane-Mokiwa and Khoza (2016), Khoza (2015a), and others view an habitual perspective in teaching as constructing the milieu that assists learners to create their distinctive individual personalities. The above researchers also regard an habitual perspective as creating exceptional knowledge for various individuals. The habitual perspective embraces particular meaning since it applies to experiences obtained from specific and particular backgrounds. According to Khoza (2015a, 2018), an habitual perspective directs the teacher to utilise the conscious mind during the teaching practice, thus becoming aware of personal actions every time. However, Czerniewicz and Brown (2014) and Khoza (2019a) assert that an habitual perspective has to do with what teachers do during their practice, which may be created for other perspectives. Be that as it may, the fundamental importance of habitual perspective is to answer why AGRIS teachers teach in particular ways.

The above suggests that other perspectives may not assist teachers to practise AGRIS effectively; such perspectives may limit knowledge constructed from individual identities. Ngubane-Mokiwa and Khoza (2016), Khoza (2016b, 2017) and Mpungose (2018) view an habitual perspective as of significance in assisting teachers to select other perspectives for teaching. This perspective may harmonise the dimensions introduced by the performance- and competency-based curriculum in AGRIS. This articulation indicates that an habitual perspective can address teachers' identities, assisting them to comprehend and assume their roles during the teaching of AGRIS. Therefore, the following principles may empower AGRIS teachers to improve their practice. Teacher knowledge may produce globally competent citizens, and knowledge represents an object as a CHAT principle.

4.3.1 Teacher knowledge plays a pivotal role during AGRIS teaching

Knowledge embraces field knowledge, skills knowledge, and customs knowledge (Ball, Thames, & Phelps, 2008). The AGRIS practice should involve content, societal, and habit-of-mind knowledge to meet the needs of the world of work. Teachers should teach prescribed content, together with indigenous knowledge, guided by a particular theoretical stance. Therefore, in AGRIS, there is a need to augment scientific knowledge and to understand indigenous knowledge while acknowledging teacher knowledge. Teacher knowledge is defined by Verloop, Van Driel, and Meijer (2001) as personal knowledge determined by individual experiences, personal history and context, and associated with teacher behaviour in the classroom (van Driel, Beijaard, & Verloop, 2001). According to Zembylas (2007), teacher knowledge has to do with the teacher's own experiences of the subject and learners, and the broader social and political setting wherein teaching and learning occur. This suggests that teacher experiences are at the core of teaching. However, teachers must know how to enact their experiences in the context of teaching and learning.

In the article written by van Driel et al. (2001) on the role of teachers' knowledge, previous curriculum endeavours have been found ineffective owing to failure to accommodate teachers' knowledge, taking their beliefs and attitudes into consideration. In the same light, Roehrig and Kruse (2005) conducted a study to examine the role played by teachers' knowledge in the enactment of the science curriculum (chemistry). This study involved twelve chemistry teachers from various secondary schools. Interviews and classroom

observations were utilised as data-generation methods. The study concluded that teachers' knowledge and beliefs played a crucial role in enacting any science curriculum in secondary schools. As cited by Roehrig and Kruse (2005), scholars like Guskey (1985), Richardson (1996) as well as Tobin and McRobbie (1996) support the results obtained by their study that teachers' knowledge indeed has a substantial influence on any teaching practice. In the chapter written by Verloop et al. (2001), it is stated that teacher knowledge may be valuable in enhancing any curriculum and making educational improvements more effective.

The above statement suggests that a curriculum that ignores teachers' knowledge (habitual perspective) may delimit learners' discernment of content knowledge. In AGRIS, teachers' knowledge may bring an understanding of what learners perceive as complex. For instance, AGRIS involves mathematical aspects challenging learners to understand: formulas are not provided during tests or examinations. For example, a teacher teaching learners calculations of feed energy values, undergoes a systematic procedure before giving learners problems to solve. The textbook shows the following procedure: 1) Gross energy (GE) is the amount of energy released when a feed is completely burnt to its final oxidation products: carbon dioxide, water, and other gases; 2) Digestible energy (DE) is the gross energy value minus the value of energy lost in the manure; 3) Metabolic energy (ME) is the gross energy value minus the energy value lost in manure, urine, and gases; and 4) Net energy (NE) is the gross energy value minus energy lost in the manure, urine, gases, and body heat, which is available for maintenance or production. However, before introducing learners to the content knowledge procedure, the teacher may put own knowledge at the centre of teaching to enhance a better understanding of the textbook knowledge. For example, a teacher may use the components available in the fake teacher's payslip. Before denoting those components, the teacher should ask learners to list aspects they feel should appear in the teacher's payslip,

to draw their full attention. Then the teacher could use Figure 4.3 below to illustrate the enactment of teacher knowledge.

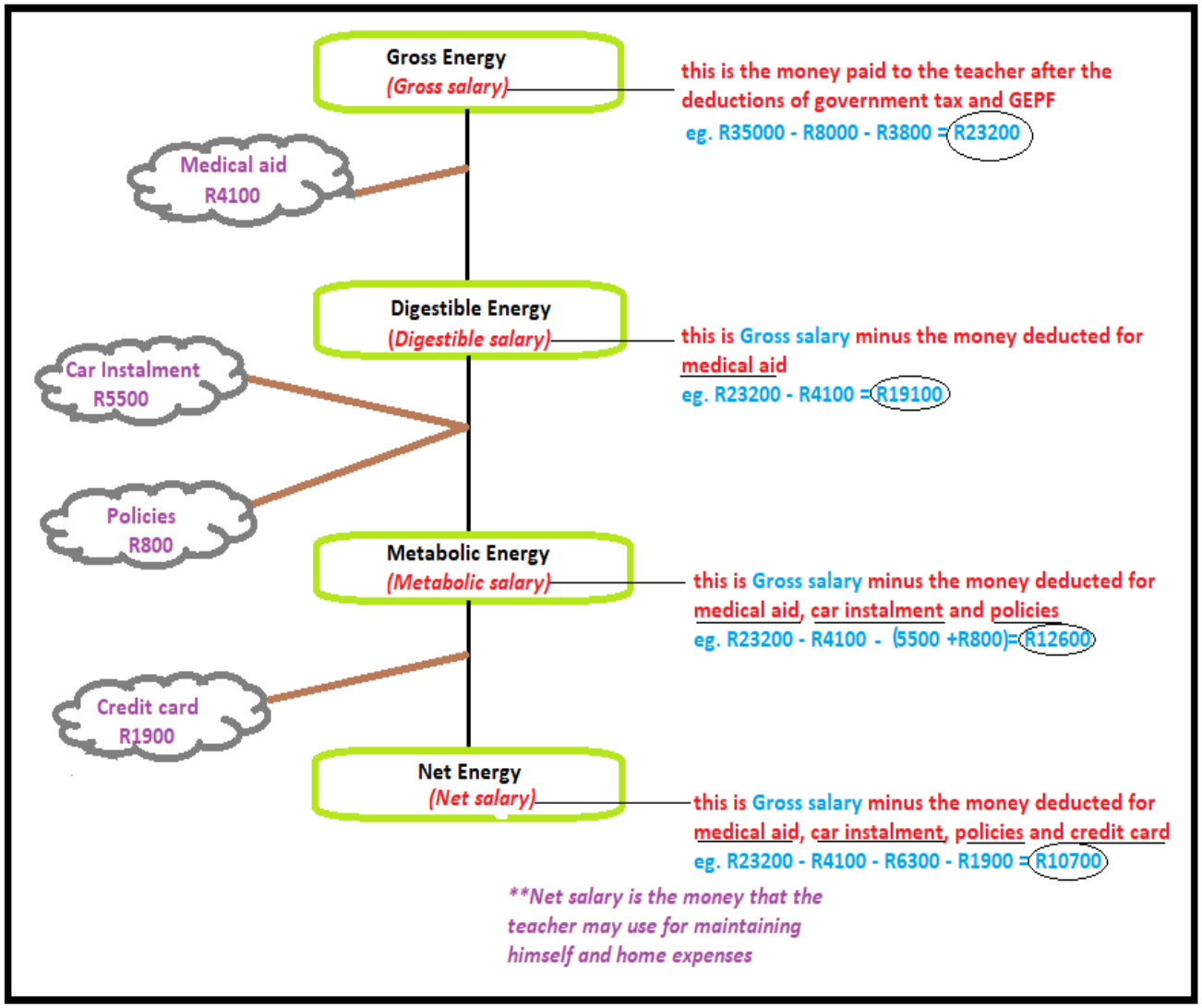

Figure 4.3: Illustration of teacher knowledge

The above diagram suggests that teacher knowledge plays a crucial role in influencing learners' discernment of calculating feed energy values. For instance, the teacher might associate gross energy with gross salary; digestible energy with digestible salary; metabolic energy with metabolic salary; net energy with net salary. In this regard, teacher knowledge is grounded by teacher personalising the meaning of the above energy values. However, the teacher should capture learners' attention during the enactment of personal experiences during the teaching process. This account implies that the habitual perspective may assist teachers to overcome learners' inability to know and understand content knowledge, which is driven by other perspectives. In the same breath, before exposing learners to the

information written in their textbooks, the teacher might bring personal experiences in to balance what learners understand from their background, and what they are expected to know from content. Teacher experiences may assist learners in solving problems independently, helping to correlate their knowledge with their teacher's knowledge and the content knowledge.

However, the South African AGRIS CAPS document is silent about teacher knowledge and how it should be enacted in the classroom. As a result, teachers may be unaware that their knowledge may bring improvement to their teaching practice. Furthermore, they may continually concentrate on other perspectives, which might fail to prepare learners for the workforce if used exclusively. This suggests that the AGRIS curriculum in South Africa may be unsuccessful and lack improvement as it seems to disregard teachers' knowledge enactment during teaching. Therefore, curriculum developers should consider incorporating teachers' knowledge into the AGRIS curriculum, ensuring that teachers receive professional development regarding its enactment. Teachers driven by an habitual perspective consider aims pivotal during the teaching process (Mpungose, 2019; Khoza, 2017b, 2018). Aims embody outcomes as a principle of the CHAT.

4.3.2 Aims as the central principle during the teaching process

According to Hannigan (2000) and Leslie (2014), aims are standard formulations of qualities that provide direction for the lesson. Scholars like Kennedy et al. (2006), Fink (2013), 'Mpungose (2016b), Ngubane-Mokiwa and Khoza (2016), and Ndlovu (2017) are of the same view that aims are statements of the teachers' intents that provide direction on how teaching should occur. Kennedy et al. (2006), Reiss and White (2014), Hardason (2017), and Ndlovu (2017) emphasise that aims are formulated from teachers' experiences to indicate implicit knowledge. This emphasis indicates that an habitual perspective drives the aims and provides for teachers' needs. Furthermore, aims involve individual teachers' ideas, ambitions, and techniques that can assist both the teacher and a learner to create a conducive atmosphere dominated by personal identities and meanings (Khoza, 2016a; Mpungose, 2016b). Likewise, Khoza (2015c, 2016b) and Schiro (2013) concur that individual meanings accrue to exceptional knowledge that the teacher holds, which in turn builds on the habitual

perspective. Thus, teachers uphold personal identities that are driven by this perspective (habitual).

Saban and Yildizli (2017) attest to the importance of investigating how Turkish primary teachers integrate goal orientations during their practice. One hundred and ninety-one primary school teachers from Turkey were the participants, and the survey method was used to generate data. The study concluded that these teachers prefer to formulate activities that best suit their teaching milieu while maintaining close and affectionate rapport with their learners. This account suggests that teachers employ their own experiences to prepare activities for their learners to promote effective teaching. However, this study was limited to Turkish primary school teachers. This indicates a need for studies of this nature to be conducted in local secondary schools, and to involve more than one data-generation method.

In the same light, Le Matais (1997) argues that aims may be inherent/intrinsic in promoting lifelong learning, building discernment for the self and society, skills and knowledge by preparing learners for the workforce to contribute to the global economy. In addition, aims concentrate on developing personal competencies or stimulating an appreciation of cultural inheritance. This is attested to by the article written by Day* and Tosey (2011). These researchers argue that well-structured aims consider learners' personalities, sensitivities and emotions, social dimensions, values, and supporting psychological rehearsal. Noddings (2007) and Hardason (2017) wrote papers on aims, goals, and values of education, postulating that aims are employed not just to formulate goals and objectives but also to evaluate them. Their notion suggests that the formulation of aims places the teachers' experiences at the centre of teaching, while driving teachers to be affectionate and to consider learners' differences and their environment and mental practice.

In addition to the above, aims are not directly measurable. Key words like learn, know, understand, appreciate, introduce, provide, allow, and others can be utilised to construct aims (Kennedy et al., 2006; Leslie, 2014). Learners must understand and become proficient at identifying the various disease types in animals; learners must be introduced to the importance of calculating digestibility coefficient; a general introduction to the history of

genetics must be provided. This suggests that AGRIS teachers should be acquainted with the key words pertinent to the formulation of aims.

However, the South African AGRIS CAPS document states only the general aims of the South African curriculum. This information may give teachers the impression that in AGRIS, aims have no use, and that teachers may be unable to formulate other propositions of goals. Therefore, the AGRIS CAPS may lack improvement and no hope of good performance. Curriculum developers should consider including specific AGRIS aims in the CAPS document for teachers to recognise the importance of such aims. Furthermore, the presence of AGRIS aims may assist teachers to formulate relevant aims for lessons. This calls for professional development on how teachers should integrate aims during AGRIS practice. The use of aims leads to ideological-ware selection (Khoza, 2017b, 2018; Mpungose, 2019b). Ideological-ware refers to tools as the principle of the CHAT.

4.3.2 Ideological-ware dominates AGRIS practice

Ideological-ware (IW) tools are invisible and intangible. They are referred to as ideas, knowledge, skills, values, experiences, teaching/learning techniques, and teaching/learning theories (Khoza, 2012, 2013a, 2017b, 2017c, 2018). Khoza (2015c, p. 124) adds that IW "*is about doing the thing right*" and is also known as technology of education (TOE) (Khoza, 2013a, 2014a, 2015b). According to Khoza (2013a) and Khoza (2015b), an IW tool has to do with individual beliefs. The tool usually drives the teacher to make an informed decision on other tools appropriate to utilise during teaching (Khoza, 2015b, 2015c, 2018). This suggests that the AGRIS practice may not occur effectively without the involvement of IW tools. These IW tools provide direction for any lesson, ideology always being behind individual teaching (Khoza, 2015a) to yield a thriving teaching milieu (Khoza, 2017c). Thus, IW tools should drive the implementation and enactment of any curriculum. In addition, IW tools are structured to elicit individual identity kept in teachers' subconscious minds to address learners' needs (Khoza, 2016a). This indicates that an habitual perspective drives IW, which is pivotal for AGRIS teaching because it allows the teacher to build a transformative milieu in which learners can change.

The paramount role of IW tools is suggested by the study conducted by Khoza (2018) exploring teachers' experiences of utilising tools in maths teaching (CAPS). Participants were six maths teachers registered as part-time students at one of the South African universities. One-on-one semi-structured interviews, reflective activities, and journals were utilised to produce data. Participants were selected using purposive and convenience sampling. The study concluded that IW tools are of significance in the practice of CAPS. Although the study was conducted at higher education institutions, various data-generation methods were utilised for data triangulation and to correctly answer the research questions. However, there is a need for a study of this nature on AGRIS secondary school teachers.

Further to the above, in Khoza's (2012) study, the researcher explored online tools used in South African universities. It is stated that IW tools stimulate teachers' performance in their practice. This study posits that the use of IW tools in AGRIS practice may promote better teaching performance, which may be displayed through the production of quality and competent critical thinkers. However, Khoza (2015b) and Nkohla (2017) conducted studies that were based on the teachers' reflections of teaching the CAPS, which found that teachers are unaware of the theories that underpin their teaching. This finding indicates that, if teachers fail to understand the ideological-ware behind teaching AGRIS, they may perform poorly. Teachers may also fail to integrate other tools assisting in fulfilling the intention of curriculum developers for CAPS.

Similarly, Khoza (2016b) explored whether teaching without understanding the curriculum visions jeopardised the CAPS. The results revealed that teachers were unaware of the perspectives that underpin the current curriculum. Teachers may thus experience various challenges regarding the CAPS practice, because differing perspectives drive any curriculum. It is accepted that an habitual perspective drives IW tools. Consequently, teachers may fail to recognise that they cannot select other appropriate teaching tools to improve AGRIS practice without understanding IW tools.

In the same light, Fomunyan (2017) conducted a study based on the importance of IW tools in improving learner performance. In this study, Fomunyan (2017) discusses the role played

by IW in improving learner performance. For instance, an IW tool serves as a bridge that assists teachers in understanding individual performance controlled by distinctive dimensions, which vary from one individual to the other. Moreover, an IW tool can transform learners undeniably since it (Fomunyan, 2017, p. 113) "*is the superstructure of civilisation or the conventions and culture that make up the dominant ideas of a society*." The use of IW tools is framed within a particular culture created from a specific historical background. Thus, IW tools may be crucial in stimulating the teaching process while sustaining quality education, because they involve ideas, experiences, and attitudes that drive teachers to teach AGRIS.

However, in AGRIS, challenges arise from the South African CAPS document, which is silent on the IW tools that underpin the curriculum. This challenge may lead to teachers' inability to understand proper IW tools appropriate to the CAPS practice. The absence of IW tools that underpin AGRIS practice indicates that South African AGRIS CAPS may not flourish: teachers may possibly select theories or tools that are not driven by an habitual perspective. Teachers may utilise tools that do not create a transformative milieu allowing learners to transform. Once the IW tool dominates the teaching practice, the teacher usually acts as a researcher during the teaching process (Khoza, 2017b, 2018; Mpungose, 2019b). The researcher represents the actor as the principle of the CHAT.

4.3.4 Researcher actions during the teaching process

A researcher is a lifelong learner (Samuel & Van Wyk, 2008; Samuel*, 2008) who contributes to his or her school and self-development (Samuel & Van Wyk, 2008). On the one hand, Samuel (2008) argues that a proficient researcher ensures education quality by being a valuable resource. On the other hand, Day, Kingston, Stobart, and Sammons (2006), Samuel and Van Wyk (2008), and Tam (2015) comment that a researcher is characterised by improved knowledge, skills, attitudes, beliefs, and values acquired from teacher education and past experiences. Thoonen, Sleegers, Oort, Peetsma, and Geijsel (2011) emphasise that a researcher possesses an extraordinary self-efficacy, displaying highly innovative ideas to work with struggling learners, thus strengthening their efforts and performance. Similarly, Fraser, Kennedy, Reid, and Mckinney (2007) and Akude (2010) affirm that researchers improve themselves through research and active involvement in professional development

actions. Teachers thus have distinctive ways of tackling and overcoming challenges in their classrooms. Likewise, Killen (2010) asserts that a researcher always goes beyond the lowest requirement, employing diagrams from the learners' milieu or experiences that learners can correlate with their real life. The researcher focuses on various techniques to address the needs of individuals, using the unconscious, subconscious, or conscious mind to perform his or her duties effectively (Khoza, 2017b, 2019a).

The above suggests that a researcher may be capable of transforming a set teaching practice. This capability may be exhibited in the teaching activities and techniques used during the teaching process. In other words, being a researcher implies bringing in self-knowledge, and ways in which self-knowledge is utilised during the teaching process. Furthermore, in AGRIS, a researcher's role may bring flexibility. The teacher may integrate new information, new interpretations, and presentation of the lesson. Above all, researchers may provide frequently developing ideas and discernments that challenge the status quo. An habitual perspective drives the researcher's role, since all the lesson planning and organisation draws on teachers' experiences and identity.

However, I have not seen any studies focusing on the researcher as one of the teacher roles. Even the South African CAPS document is silent on this type of role during the teaching process. This statement signifies a gap in the literature as well as in the AGRIS CAPS. There is a need for studies to focus on the researcher role, which is driven by the habitual perspective. This suggestion indicates that the presented literature on the researcher role may assist curriculum developers to understand and discover the imperativeness of this role during the teaching process. The researcher always employs a teacher-centred method during the teaching process (Khoza, 2017b, 2018; Mpungose, 2019b). The teacher-centred method symbolises the division of labour as a principle of the CHAT.

4.3.5 The teacher-centred method directs the teaching process

Various scholars aver that the teacher-centred method is influenced by experiences gained during the teaching process, resulting in individual teacher behaviour (Berkvens et al., 2014; Khoza, 2015b; Mpungose-, 2018). According to Khoza and Biyela (2020) and Mpungose

(2018), a teacher-centred method is driven by beliefs stored in and recovered from the subconscious mind to generate the teacher's role, addressing the teacher's needs without being objective. The above researchers further state that this method is framed by personal experiences as well as a cultural and historical background. Teachers' needs are focused on and are dominated by teacher-centred activities to ensure that learning goals are met. In this regard, the teacher-centred method is driven by personal activities that reflect the behaviourism theory; and is dominated by activities characterised by the change in behaviour (Khoza, 2013b, 2015b). However, Misdi, Dian, and Agus (2013) affirm that the teacher-centred method requires a good quality teacher who presents a good model character to learners. A teacher-centred method is grounded on thoughts saved in the subconscious mind, enabling the teacher to take personal actions to address personal needs. The teacher-centred method is propelled by an habitual perspective in which personal activities are vital during the teaching process in addressing the individual needs of learners in schools. However, in order for teachers to formulate teaching activities that may enrich learning goals, professional development is pivotal. This indicates that teacher-centred activities dominate the teacher-centred method.

The study conducted by Khoza (2013a) to explore a framework that lecturers utilise to transform students into digital natives states that teaching activities entail how teaching occurs. Further to this, this study highlights that teacher-centred activities should be relevant to learners' reality. On the one hand, Kaya, Kablan, Akaydin, and Demir (2015) postulate that teacher-centred activities put the teacher at the centre. On the other hand, Sak, Tantekin-Erden, and Morrison (2018) claim that the learner's needs, personal identity, and cultural environment must be considered. The effectiveness of any curriculum rests on teachers ensuring that their lesson plans consider learners' evolvement characteristics, their needs, individual uniqueness, and cultural milieu, to achieve learning goals.

In addition to the above, Johnson and Van Wyk (2016) view the teacher-centred method as effective in enabling teachers to discover modern skills and knowledge. For example, an AGRIS teacher may give Grade 12 learners SWOT analysis (strength, weakness, opportunity, and threats) (SWOT) analysis to undertake an evaluation of a local shop/business. The prepared lesson encourages learners to delve into, undergo, and observe

the true situation. However, for the practical enactment of a teacher-centred method, a teacher must be aware of various teaching methods, which are suitable for the teacher-centred method, namely: direct instruction method; whole-class discussion; teaching a large class as a method; question and answer; textbook method; and cartoons as a method (Johnson & Van Wyk, 2016, p. 109). Nonetheless, the teacher should never forget that learners' identity is unique. The teaching activity may bring new knowledge and skills that originate from the teacher and learner experiences.

However, various scholars like Elen, Clarebout, Leonard, and Lowyck (2007), Smit, de Brabander, and Martens (2014), Agyei and Voogt (2016), Souleles (2017), Di Felice (2018), Di Biase (2019), and others, have conducted studies to compare teacher-centred and learner-centred methods, criticising the use of the teacher-centred method. These authors share a similar view that the teacher-centred method/teacher-centred activities address content knowledge, teachers transmitting knowledge, while learners are passive vessels. Furthermore, the authors criticise this method for being a 'chalk and talk' method and time-consuming. According to the above researchers, a teacher-centred method fails to prepare learners for high-performance levels. Learners are not capacitated to deal with content knowledge of other subjects. The researchers share a similar sentiment that better quality teaching and learning requires a transition from the teacher-centred method to other methods. Cognitivism and the constructivism theory should drive those methods. This indicates a gap in the literature − principles that develop cognitive and psychomotor domains drive scholars. Scholars have researched little on the habitual perspective. This suggests that the current teaching and learning process disregards teachers' and learners' needs, experiences, ambitions, and emotional characters. Therefore, there is a need for various studies on the teacher-centred method, which may be driven by the habitual perspective.

Furthermore, even the AGRIS CAPS document in South Africa posits the teacher-centred method as the method that teachers should use to transmit knowledge to learners in order for them to complete the syllabus. However, this may bring deficits to the South African AGRIS curriculum. A better discernment of AGRIS concepts relies on teachers' and learners' experiences. This implies a need for various studies on teacher-centred methods, which may be driven by the habitual perspective. The availability of those studies may enlighten

curriculum developers to discover the difference between other methods and teacher-centred methods. Appropriate dimensions of the teacher-centred method must be stated, providing professional development on how to integrate experiences during the teaching process. The teacher-centred method drives the teacher to utilise a formative assessment (Khoza, 2017b, 2018; Mpungose, 2019b). The formative assessment represents the rules as a principle of the CHAT.

4.3.6 Formative assessment as assessment for learning

Owing to a paradigm shift in assessment, a formative assessment has become one of the essential types of assessment, which emphasises feedback as the core element, while embracing the constructive method (Bhagat & Spector, 2017; Box, Skoog, & Dabbs, 2015; Decristan et al., 2015; Ismail & Mohammad, 2017; Nicol & Macfarlane-Dick, 2006; Rushbon, 2005). Box et al. (2015) describe formative assessment as a process rather than a single occurrence, including the teachers' and the learners' experiences. Cowie and Bell (1999), Decristan et al. (2015), as well as Furtak and Thompson (2016) define this assessment as the frequent usage of assessment-based data to diagnose and respond to learners' needs in order to improve learning. Various scholars like Dunn and Mulvenon (2009), Bennett (2011), Mokhtar and Adnan (2017), Rothman (2018), Khoza (2013b, 2016a, 2017b, 2018), Mabuza (2018), Mpungose (2018; Mpungose, 2020b) and Dlamini (2018) declare formative assessment as of significance in education. They agree that formative assessment is the assessment for learning that provides teachers with opportunities to provide feedback to learners to improve learners' discernment quality. Assessment for learning disregards the provision of marks to learners' performances but aims at identifying learners' needs and weaknesses during teaching so that they are adequately prepared for the assessment of learning (Mokhtar & Adnan, 2017; Yorke, 2003). This suggests that an habitual perspective drives formative assessment, being based on what the teacher/learner knows or has learned from a personal background.

Further to the above, Sach (2015) conducted a study to explore teachers' perceptions of promoting or hindering formative assessment enactment in schools. Participants were teachers from lower and middle schools; and the interview was employed as a data-generation method. The study concluded that teachers recognise the pivotal role of formative

assessment in stimulating learning. However, the department policies and school customs hinder the effectiveness of this assessment. This study used a small sample of teachers from lower and middle schools and concentrated on one data-production method. The study could have been improved by including teachers from high schools; also, if two data-generation methods had been used to ensure trustworthiness. In addition, this is an international study, which indicates the need for further studies on formative assessment that may be conducted in local secondary schools and extended to the perspectives that promote formative assessment.

Moreover, formative assessment should be recognised as a crucial aspect in facilitating the teaching process; therefore, it should be properly structured to enhance learners' discernment of their subjects (Ismail & Mohammad, 2017). Furthermore, Dunn and Mulvenon (2009, p. 1) postulate that "*the use of formative assessment facilitates improvement in instructional practices, identifies 'gaps' in the curriculum and contributes to increased student performance*." In the same light, Sach (2015), Spector et al. (2016), and Alonzo (2018) agree with the role of formative assessment posited by Dunn and Mulvenon. In addition, Spector et al. (2016) add that this type of assessment generates opportunities to stimulate learners' explanation, interpretation, and intellectual skills. Teachers must be capable of adjusting lessons, and checking for learners' discernment. In addition, Rothman (2018, p. 4), Black and Wiliam (2009)Black and Wiliam (2009)Black and Wiliam (2009), and Alenzo (2018) delineate the aspects of formative assessment in Figure 4.4 below.

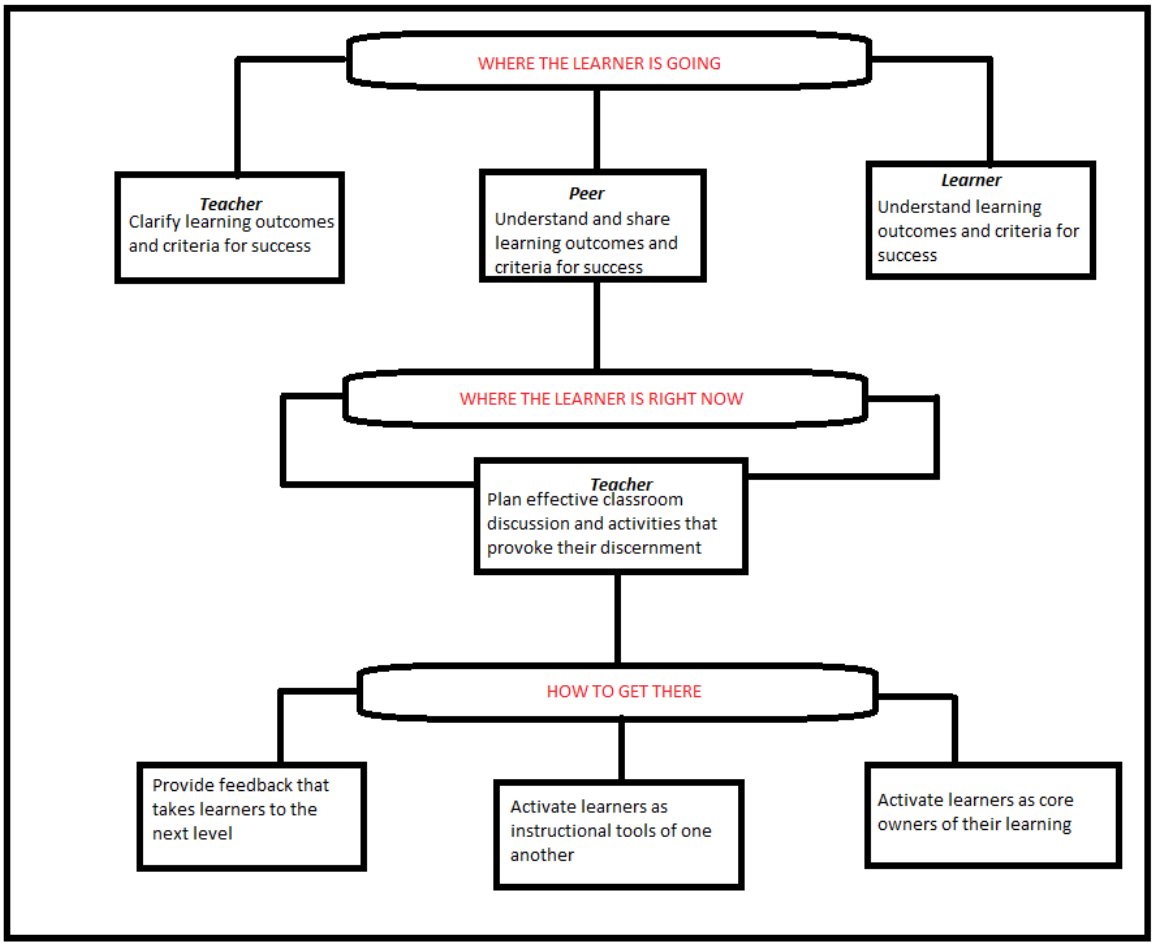

Figure 4.4: Aspects of formative assessment (Black & William, 2009, Bennett, 2011; Mokhtar & Adnan, 2017; Alenzo, 2018)

The above aspects of formative assessment suggest: 1) That the teacher should know where the learner is going (the teacher should provide direction by explaining learning outcomes, ensuring that learners understand those learning outcomes and how learners will be assessed); 2) Where the learner is right now (the teacher can discover the learner's strengths and weaknesses through planned activities as well as classroom discussion); 3) How the teacher can take learners to the next level (providing feedback that can move learners forward, ensuring that learners share information proficiently, and ensuring that learners are taking complete control of their learning). This suggests that teachers may not enact formative assessment without proper planning, knowing individual learners, and understanding their social and physical milieu.

Moreover, AGRIS teaching should involve the teacher, learner, and peers, thus enacting formative assessment effectively. This also indicates that formative assessment promotes the active engagement of teacher knowledge or experiences; and is driven by an habitual perspective. Aims should guide the use of this assessment that teachers should elucidate from the beginning of the lesson. Therefore, aims should steer question formulation and teaching activities in enacting formative assessment successfully. Aims may assist AGRIS teachers in assessing learners' competencies effectively. The formative assessment may be the most appropriate way of improving AGRIS practice. Therefore, AGRIS teachers should adhere to the aspects mentioned above on formative assessment. Learners may thus develop own ability to work independently, and to be accountable and effective learners.

However, various scholars argue over the use of formative assessment. For instance, it is a core argument for Nicol and Marfarlane (2006) that this assessment and feedback should empower learners to be self-regulated. Self-regulated learners are more successful than others in generating advanced feedback. Sach (2018) is concerned that teachers portray this type of assessment as a fundamental aspect of their daily teaching. Spector et al. (2016) argue that activities that include complex problem solving and critical thinking become extra demanding for learners to provide appropriate feedback, therefore consume much time. However, in the case of activities involving critical thinking and complex problem solving, Bhagat and Spector (2017) argue that technology can assist learners in tackling such activities with ease.

Nonetheless, Clark* (2015) claims that formative assessment is different from other forms of assessment, it being grounded in socio-cultural aspects, which elicit information on a particular culture and historical background. Herman, Osmundson, Dai, Ringstaff, and Timms (2015) add that teachers' lack of knowledge can produce bad decisions that can hamper learners' progress. Pinger, Rakoczy, Besser, and Klieme (2018) argue that planning successful formative assessment can be demanding and time-wasting for teachers. In the same light, Black (2015) adds that teachers view this type of assessment as an extra workload on their shoulders. This suggests that other perspectives that limit the engagement of experiences may continue driving AGRIS teachers.

The AGRIS National Protocol for Assessment document in South Africa recognises formative assessment as part of the assessment teachers should administer during agricultural practice. However, it fails to outline how teachers should enact this type of assessment. Lack of guidance from the assessment document may influence teachers to ignore formative assessment, considering it as extra work and time-consuming (Black, 2015; Pinger et al., 2018). Further to this, AGRIS teachers may not focus on teacher-centred activities aligned with the habitual perspective. Teachers may produce learners with excellent grades but insufficient skills required in the workforce. Curriculum developers should consider including guidelines explaining how to enact formative assessment and provide support for teachers. Mpungose (2019) and Khoza (2017b, 2018) posit that teachers who are driven by a habitual perspective prefer the blended milieu to any other form.

4.3.7 Blended milieu and days as teaching time

The blended milieu is any educational course that combines face-to-face and online digital teaching methods (Basitere & Ivala, 2017; Bawaneh, 2011; Frick & Laudal, 2017; Kose, 2010; Williams, Bland, & Christie, 2008). The blended milieu enhances set time and advances the learning experience (Khalil, Meguid, & Elkhider, 2018; Yigit, Koyun, Yuksel, & Cankaya, 2014). On the one hand, Khoza and Biyela (2020) agree that a blended milieu has to do with the use of an online and face-to-face milieu, driven by theories that are aligned with a particular cultural and historical background. On the other hand, Evseeva and Solozhenko (2015, p. 205) refer to this type of milieu as the "*phenomenon in which face-to-face learning and teaching experiences are combined with online tasks and activities."* This suggests that in the blended milieu, teachers may integrate synchronous and asynchronous components to improve the teaching and learning of AGRIS.

Kihoza, Zlotnikova, Bada, and Kalegele (2016) conducted a study using Tanzania secondary schools. The purpose of their study was to assess teachers' capabilities of employing a blended milieu. Some 50 secondary schools in Tanzania, two schools with ICT infrastructure and two schools without ICT infrastructure were selected for this study. Curriculum developers, secondary school teachers, and policy developers were participants. Data-generation methods were document analysis, interviews, classroom observations, and questionnaires. The study concluded that teachers lack ICT knowledge, a dependable

internet connection, appropriate tools (HW and SW), and relevant theories that unpack the incorporation of ICT into teaching and learning. This study was conducted in Tanzanian secondary schools using mixed methods, and it was a survey research. This indicates a need for a study that may involve local secondary schools in which action research may be utilised as the study methodology.

Nevertheless, various scholars have conducted studies that assure that a blended milieu improves teaching and learning. For instance, Ng and Xie (2017), Blackstock, Edel-Malizia, Bittner, and Smithwick (2017) and Vold, Kionig, and Ranglunal (2017) conducted various studies of a similar nature, assessing the impact of the video as an online tool for a blended milieu. Their studies concluded that blending online and face-to-face milieu is effective. The blend permits the learners to keep their learning on track while maintaining their interests and discernment for the particular topic. On the one hand, scholars like Williams et al. (2008), Bawaneh (2011), Bliuc, Ellis, Goodyear, and Piggott (2011), Xie, Yuen, Huang, and Ng (2016), and others conducted studies that focus on the effect of the blended milieu on student performance. The results showed that this type of milieu enhances learners' involvement and has a positive influence on learners' academic performance.

On the other hand, Tseng and Walsh (2016), Kharb and Samanta (2016), Basitere and Ivala (2017) investigated teachers' and students' experiences on the use of blended milieu. They concluded that a blended milieu facilitates the discernment of the subject while promoting independent self-education and self-creative methods, providing access and elasticity to various teaching tools. This implies that a blended milieu may enhance in-depth understanding of AGRIS. The teacher then employs appropriate theories to bring balance between HW and SW tools. A blended milieu underpins the utilisation of the conscious and subconscious minds wherein the teacher may quickly adapt to distinctive roles during the teaching process. Kaur (2013) views a blended milieu as effective in making all the transformative changes that technological evolvements bring to education. Therefore, the Blended Milieu Model can be utilised to integrate separate components that would be effective for teaching process. Figure 4.5 below presents the components of the Blended Milieu Model.

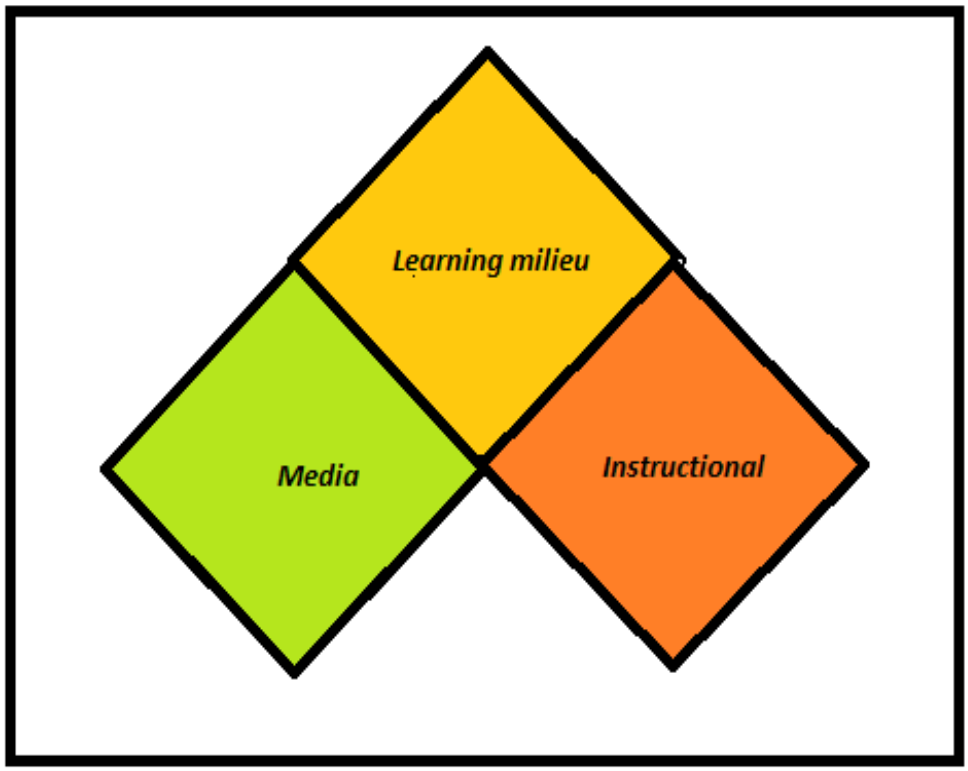

Figure 4.5: Components of the Blended Milieu Model (Kaur, 2013)

The above diagram shows that, although every *learning milieu* component can either be synchronous or asynchronous, the blended milieu can influence the explicit positive qualities of each milieu, ensuring the optimal usage of tools to meet teaching goals. *The media* component may enable AGRIS teachers to convey subject knowledge to learners. However, teachers should choose ideal media that may be appropriate for learners to achieve their learning outcomes. By contrast, the *instructional* component has to do with selecting the most relevant teaching strategies to support learning objectives during the teaching of AGRIS. A blended milieu model may ensure a balance between all the components, no single component being better or worse than any other. This indicates that an habitual perspective drives a blended milieu that may be vital in maintaining and improving the quality of education, while making teaching more exciting and enriching for teachers.

However, the South African AGRIS CAPS document is silent on the use of a blended milieu in schools. The document only states that teaching and learning should take place face-to-face; hence, the Department of Education is emphasising the use of technology during teaching and learning. This statement suggests that an habitual perspective does not drive

the current teaching of AGRIS. In this regard, teachers may fail to integrate the face-to-face and other types of milieu. Teachers may be failing to practice the blended milieu in their respective classrooms. Consequently, teachers may fail to harmonise the learning milieu with media and instructional components during their practice. This challenge indicates that curriculum developers should review the use of the learning milieu in AGRIS, considering that the sole use of a face-to-face milieu is not productive. Therefore, curriculum developers should stipulate the type of milieu, stating how and why teachers should employ any distinctive learning milieu during their practice. This may assist AGRIS teachers in selecting the most relevant teaching strategies, teaching tools, and teaching activities to enhance teaching goals.

In addition, Khoza (2017b, 2019) and Mpungose (2019) postulate that teachers driven by an habitual perspective employ days as their teaching time. However, the teaching of AGRIS is based on weeks, as stipulated by the South African CAPS document. This implies a gap regarding time in habitual perspective literature − I have not found studies that address teaching time in a pragmatic-based curriculum.

4.4 Conclusion of the Chapter

This chapter embodied the literature that provided an in-depth understanding of the habitual perspective of teaching agricultural sciences in secondary schools. Furthermore, the chapter has presented the habitual perspective, which is driven by the personalised CHAT principles. Therefore, this chapter showed personalised principles that are represented as follows in the CHAT: object *(teacher knowledge)*, outcome *(aims)*, tools *(ideological-ware)*, actors *(researchers)*, division of labour *(teacher-centred method)*, rules *(formative assessment)*, and community *(blended milieu)*. The literature shows that habitual perspective principles are in line with a pragmatic-based curriculum and capable of bringing balance between a prescriptive perspective (performance-based curriculum) and a communal perspective (competency-based curriculum).

The above suggests that the PCHP (Prescriptive, Communal and Habitual) Perspectives theoretical framework is firmly recognised by this study. It is the most appropriate framework for ensuring adequate knowledge, skills, and attitudes as per South African CAPS requirements. As a result, Figure 4.6 below delineates the AGRIS PCHP framework.

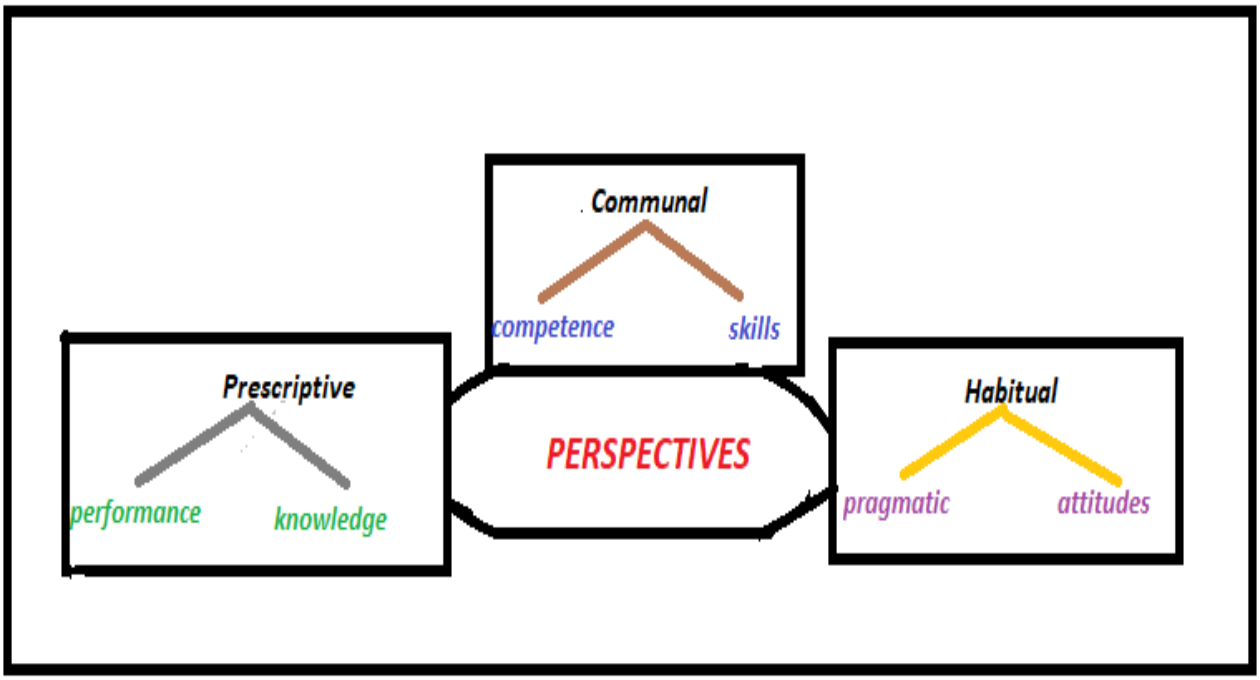

Figure 4.6: AGRIS PCHP theoretical framework

The outcome of the literature denotes that quality assurance in AGRIS practice may be attained by intertwining the prescriptive, communal, and habitual perspectives. Therefore, the literature provided solid evidence that a PCHP theoretical framework is optimal for analysing data. If so, the prescriptive, communal, and habitual perspectives may inform AGRIS teaching in schools to tackle or address individual needs. This account indicates that teachers' habitual perspective is dominated by internalised principles produced and stored by the conscious mind. The conscious mind drives the prescriptive perspective, which teachers adopt and accept as their belief. In this regard, teachers may adhere to set policies and procedures in teaching AGRIS in schools. Thus, the habitual perspective is kept in the subconscious mind. This mindset dominates when particular cultural, behavioural patterns influence the teaching, and when teachers teach AGRIS to address personal or social needs.

In addition to the above, the PCHP framework may offer in-depth discernment as to the (prescriptive perspective) policies or intended procedures teachers employ during their

practice. The framework may subsequently denote how (communal perspective) teachers integrate social experiences during the teaching of AGRIS. Above all, this framework may bring a better understanding of reasons for teachers teaching in particular ways. Therefore, the 'why' question drives the habitual perspective. This question relates to the individual identity, resulting from internalisation, externalisation, the conscious/subconscious mind, culture, and historical background. The subsequent chapter unpacks and describes the research design and the methodology employed to produce data that may answer the what, how, and why questions.

CHAPTER FIVE

THE ACTION OF EXPLORING AGRIS TEACHERS' PERSPECTIVES

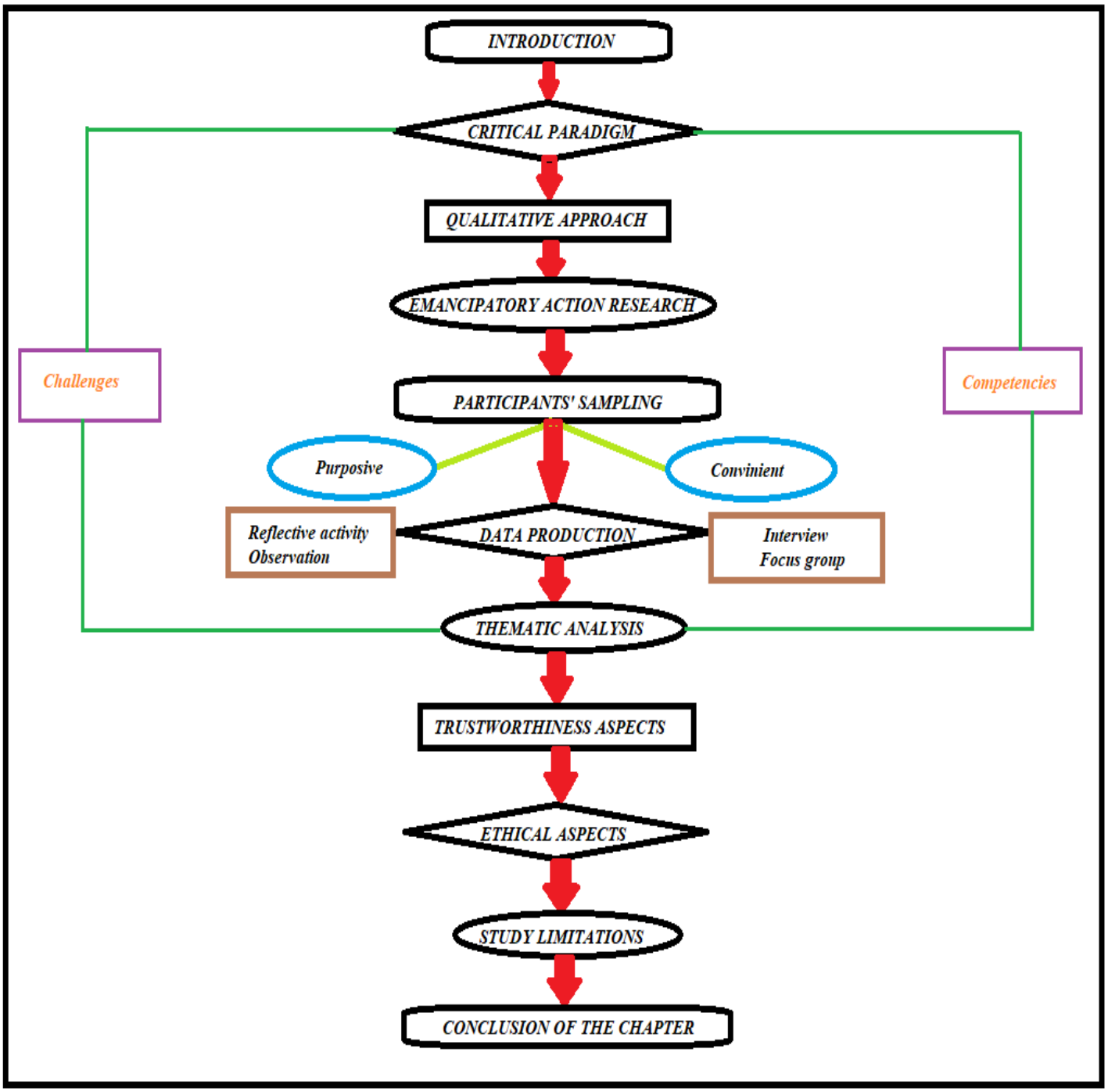

Figure 5.1: Chapter 5 flow diagram

5.1 Introduction

The preceding chapter outlined an extended version of conceptualising the literature into the PCHP theoretical framework. This chapter provides an in-depth understanding of how perspectives (phenomena) and their underlying principles can be utilised to classify themes in data production. Furthermore, this chapter outlines the research design and methodology in accordance with the PCHP principles. At the same time, it provides an extensive account of explicit research methods that are optimal in producing data on teachers' perspectives of teaching agricultural sciences in secondary schools. Any research includes a plan of action to justify data underpinnings (Strydom, Fouche, & Delport, 2014).

This chapter delineates the type of approach (qualitative) and the paradigm (critical) which frames the study. Moreover, it discusses the research methodology used throughout the exploration of teachers' perspectives. In addition, this chapter unpacks the research style (action research), and the sampling methods (purposive and convenience). The data-production strategies (reflective activity, observation, one-on-one semi-structured interviews, and focus groups) are mentioned, together with the way in which the data was analysed. Teachers' confidentiality was maintained by adhering to ethical protocols. Lastly, this chapter discusses the trustworthiness issues of credibility, confirmability, dependability, and transferability. The chapter then concludes. Experiential research either by the explicit or implicit research design forms an integral part in addressing teachers' perspectives and answering research questions. Therefore, there is a need to start by outlining the research design.

5.2 The brief delineation of the research design

A research design designates the preferences and the systematic steps the researcher has undergone throughout the whole planning of the study, for instance, who will provide data, when, and where (Creswell, 2013, 2014; McMillan & Schumacher, 2010). The systematic procedures involve data generation and data analysis to address research questions. (Durrheim, 2006) believes that the structure of this type of design should display the correlation between the theoretical paradigm, the approach, the research style, sampling methods, data-production methods, and the data analysis. The above researcher believes that

research design is similar to a house plan, which provides builders with ideas and guidelines on house structuring. The researcher is a constructor who identifies the requirements needed, how to obtain them, and where to place them. Thus, the research design is vital in guiding the research process, giving it credibility and relevance (Cohen* et al., 2013; Maree, 2007; McMillan & Schumacher, 2010). A prescriptive perspective drives the research design in this study, advocating for systematic procedures to be followed to reach an in-depth understanding and interpretation of the phenomenon.

The information mentioned above indicates the procedure of this design and commences with the objectives and the research questions. Thereafter, the research paradigm, and the study's epistemological and ontological assumptions are discussed. Subsequently, the research approach, research sample, research methods, ethical issues, and trustworthiness are considered. Creswell (2013), Bertram and Christiansen (2014a), attest to this by viewing the design as a systematic explanation of the research procedure from the preparation stage through to the action stage and presentation of findings to discern the phenomenon. However, Cohen et al. (2011) and Christiansen et al. (2010) aver that the research design is an elastic and non-linear procedure. This statement implies that the research design of this study may be non-sequential but based on philosophical deliberations as such deliberations ascend throughout the study. Nonetheless, all the aspects of the research procedure are sufficiently embraced and connected. Thus, the purpose, objectives, and research questions, were stated to remind the readers of the nature of the study.

5.3 The Purpose of the Study

The purpose of this study was to explore teachers' perspectives of teaching agricultural sciences in secondary schools. Participants were teachers of secondary schools in two districts of KwaZulu-Natal.

5.4 Research Objectives

The following objectives led to the exploration of teachers' perspectives and the attainment of the study purpose:

- To explore teachers' perspectives of teaching agricultural sciences in secondary schools.
- To understand how teachers apply perspectives in teaching agricultural sciences in secondary schools.
- To explore the reasons for teachers having particular perspectives of teaching agricultural sciences in secondary schools.

5.5 Research Key Questions

The following questions aided this study in producing data for the attainment of the objectives mentioned above.

- What are the teachers' perspectives of teaching agricultural sciences in secondary schools? *(prescriptive)*
- How do teachers apply perspectives in teaching agricultural sciences in secondary schools? *(communal)*
- Why do teachers have particular perspectives of teaching agricultural sciences in secondary schools? *(habitual).*

Further to the above, a preliminary step in establishing the research design is to institute the research paradigm (Creswell & Poth, 2017). Therefore, the lens used to look at this study is the critical paradigm.

5.6 The Nature of the Critical Paradigm

Creswell (2009), Cohen et al. (2011), and others believe that any research must begin with the definition of its research paradigm, this being the way in which the researcher views the world. It was pivotal for this study to provide in-depth discernment of the research and paradigm. Armstrong and Sperry (1994), Creswell* (2008), and Christiansen et al. (2010) define research as a logical procedure of any inquiry that researchers follow to obtain in-depth discernment, which in turn draws from experiential data. However, in the context of this study, the word research was aligned with three perspectives. Research is prescriptive, a systematic approach being followed to obtain teachers' perspectives (phenomenon). The evidence is objectively produced by scholars' data (Mpungose & Khoza, 2017).

Furthermore, research in this study is communal, data produced including everyday knowledge, the evidence subjectively produced by teachers' opinions (Khoza, 2017). Moreover, research is also habitual since this study focused on providing extensive comprehension of the researcher's clarification of the results (Mpungose & Khoza, 2017). Thus, to discern teachers' perspectives of teaching AGRIS, the word research in this study addressed logical procedure (prescriptive perspective), data production (communal perspective), and interpretation and data analysis (habitual perspective). De Vos et al. (2011), Cohen* et al. (2013), De Vos et al. (2014), Creswell and Poth (2017) and others affirm that in any research, paradigms play a vital role.

A paradigm is a design and framework made up of educational and systematic philosophies, beliefs, and assumptions which address the research (Olsen, Lodwick, & Dunlap, 1992). By comparison, Guba (1990) defines a paradigm as the fundamental values that drive a researcher's actions. In this context, a paradigm drove the study to employ the prescriptive, communal, and habitual perspectives. A research paradigm is a philosophical disposition that provides directions to a study so as to understand the encompassing world (Budden, 2017; Cohen et al., 2011; Creswell, 2009). Thus, the research paradigm denoted the position taken by this study in quest of reality; the paradigm addressed how the study understands and views the world.

Christiansen et al. (2010), Creswell and Poth (2017) and others postulate that the world of research is viewed distinctively. For instance, researchers may employ either a positivist, postmodernist, interpretivist, or critical paradigm. Thus, a critical paradigm was adopted to explore teachers' perspectives of teaching AGRIS. This assisted them in discovering personal identities optimal to their practice. Why is a critical paradigm relevant for this study?

A critical paradigm is a manner of thinking wherein researchers and participants become motivated to reflect on their experiences, thus transforming their status (Khoza & Biyela, 2020). This paradigm aims to explore, critique, and bring about transformations, thereby freeing participants from habits that oppress them within their settings (Blaikie, 2009; Cohen'

et al., 2007; Khoza, 2015a; Khoza & Biyela, 2020; Rahman, 2016). This articulation is in line with Patton (2002) opinion that the critical paradigm is a strong frame in social sciences. The critical paradigm goes beyond understanding: it critiques and takes action on matters concerning society. Even so, the critical paradigm brings liberation to participants, allowing them to provide their view of their condition and the world they inhabit (Babbie & Mouton, 2008; O' Leary, 2004). This paradigm can therefore interrogate teachers' perspectives (phenomenon) in effecting change in AGRIS practice. This paradigm may transform how AGRIS teachers view the curriculum, and thus take informed action to improve society. Furthermore, this paradigm emancipates AGRIS teachers from chained and preordained personal actions by revealing a comprehensible societal truth. Therefore, the habitual perspective drove a critical paradigm, focusing on development of individuals in the community.

The critical paradigm enabled the study to examine and interrogate the relationships between school and society, how schools perpetuate inequality, and whose interests are served by education (Cohen` et al., 2018, p. 52). This paradigm, in exploring teachers' perspectives of teaching AGRIS in schools, brought an in-depth understanding of the interactions between curriculum developers and the teachers. On the one hand, it delved into who perpetuates inequality within the education system. On the other hand, it enabled the study and the participants to realise how curriculum developers have designed the AGRIS curriculum. For instance, this paradigm assures that the prescriptive, communal, and habitual perspective drives the AGRIS practice. This, in turn, capacitated teachers to take relevant actions that can bring change to their practice.

In addition to the above, this paradigm granted the study an opportunity of being involved in and familiar with individuals' daily lives within the community to address teachers' perspectives (Cohen* et al., 2013; Edwards & Skinner, 2010). This is supported by Babbie et al. (2011) articulation that, in the critical paradigm, researchers should focus on comprehending and transforming social conditions to emancipate every member of society. The study employed an habitual perspective to create a conducive setting, allowing the participants to share opinions freely on their social-life experiences. The critical paradigm promoted teamwork to the extent that participants became inspired to critique how they teach

AGRIS in schools as individuals. As a result, inequalities amongst AGRIS teachers were resolved: participants were permitted to devise various strategies to transform their practice. According to Creswell (2014), Creswell and Poth (2017) and others, the critical paradigm employs various theoretical suppositions such as epistemology, ontology, axiology, and methodology.

5.6.1 Critical paradigm theoretical suppositions

Epistemology has to do with how the researcher comes to know the truth, understanding the disposition of knowledge (Cohen et al., 2018; Mpungose, 2018). Epistemology explores distinctive techniques of knowing the truth; and the relationship between belief and knowledge (Gray, 2013; Jackson*, 2016). This implies that social practices impact epistemology. What society practices depicts a modest means of knowing. Epistemology refers to an individual's view of the world, informed by individual personal experiences in a particular society. Therefore, in this study, epistemology is an habitual perspective, The exploration of teachers' perspectives is reliant on individual experiences of AGRIS practice. However, teachers' perspectives presented multiple truths and realities.

According to Guba and Lincoln (2005), Blaikie (2009), Creswell (2014), (Jackson*, 2016), Cohen et al. (2018), Mpungose (2018) and others, multiple beliefs, and the nature of reality are referred to as ontology. In this regard, ontology is a communal perspective, knowledge being generated by teachers' opinions apropos of various societies. In this study, ontology played a significant role in obtaining multiple truths. All teachers were granted opportunities of understanding the phenomenon (teachers' perspectives). In addition, teachers' involvement with their existence generated multiple realities, which enabled me to empower them. Epistemological and ontological suppositions resulted in constructing methods of producing data.

The methodology is a systematic structure used to research a particular paradigm (O' Leary, 2004). By contrast, Guba and Lincoln (2005) view methodology as the nature of the inquiry that constructs the dialogic manifesto during data production. The above researchers further postulate that, in methodology, the researcher seeks the desired information and discernment

via various data-production methods. This suggests that methodology is a prescriptive perspective − one has to follow a systematic procedure to obtain data on the phenomenon. This study has sustained this supposition by employing four data-production techniques. In the context of this study, reflective activity, observations, one-on-one semi-structured interviews, and focus groups were used to construct a better discernment of teachers' perspectives. The last theoretical supposition for the critical paradigm is axiology.

Axiology has to do with ideologies and meanings in directing research and the ethics that rule such (Cohen et al., 2018). However, axiology also has to do with what the research does or does not value (Heeks & Wall, 2018). This study adopted axiology as defined by Heeks and Wall (2018), the values of liberation steering such. This research is inspired to transform society by being involved with the AGRIS teaching. In order to achieve that, I devised various means of communicating with teachers to assist in discerning their status, recognising challenges and opportunities for change, and taking action by enacting resolutions. Therefore, in the context of this study, axiology is addressed from an habitual perspective. As a result, this study unpacked teachers' perspectives by applying a critical paradigm.

5.6.2 Critical paradigm in action

This study employed a critical paradigm to challenge the status quo of a society, developing that society into one equalised or stable (Mpungose, 2018). In line with McGregory and Murnane (2010) and Cohen et al. (2011), this paradigm allows one to develop a means of rectifying social injustices and biases. Furthermore, the critical paradigm was applied to reveal power relationships in society. Thus, teachers who had little power, who felt oppressed by the AGRIS curriculum, or were somehow restricted from executing their duties, receive assistance and liberation most efficiently. Most educational organisations are dominated by political, social, cultural, economic values, and by history. This paradigm was employed to transform AGRIS teachers by addressing the system's social, political, and cultural injustices. In addition, this study adopted this paradigm to obtain an in-depth understanding of teachers' perspectives from teachers teaching the subject. The reason behind involving teachers teaching the subject was to elicit their consciousness to obtain deeper understanding about how and why they feel oppressed. At some point, teachers were

aware that they are oppressed; however, they felt powerless and unable to take informed actions. The critical paradigm was embraced as the optimal emancipatory tool, resulting in teacher's liberation and empowerment.

Further to this, this paradigm was employed to transform not only teachers' conditions but the entire AGRIS practice. Several scholars have used a critical paradigm to change teachers' various situations. Those studies substantiate perspectives emanating from this study. Below is Table 5.1 presenting some studies conducted on the critical paradigm.

Table 5.1: Distinctive Studies Displaying the Critical Paradigm in Action research

Writers	***Summary of the study***	***Findings of the study***
Mabuza (2018)	The study was driven by critical action research to explore the reflection of nine consumer studies teachers in Swaziland. These teachers were expected to reflect on their teaching to improve their practice. Reflective activity, one-on-one semi-structured interviews and focus-group discussions were data-production techniques for the study.	The results of the study showed that certified reflections drive the teaching of consumer studies. Thus, the study recommends that teachers first understand their identity to intertwine certified, public, and own reflections. Consequently, this study seeks communal and habitual perspectives to transform teachers' situations.
Mpungose (2018)	Critical action research drove this study, and it was conducted to explore the reflections of lecturers on physical sciences teaching via Moodle. Participants were expected to adopt action research to reflect on their physics teaching. Purposive and convenience sampling methods	The results showed that informal, non-informal, and formal reflections were employed during Moodle teaching. However, more concentration was placed on informal reflections. Consequently,

	were employed to choose five participants for the study.	this may cause discrepancies in the university physical sciences Moodle curriculum. Therefore, the study recommends that lecturers should maintain a balance between all levels of reflection. This study combines a prescriptive, communal, and habitual perspective for effective teaching of physics via Moodle.
Khoza and Biyela (2019)	This study involved ten first-year students teaching mathematics. The study was orchestrated to explore and decolonise the content, together with the pedagogical and technological knowledge that students possess. Data-production methods employed during this critical action research were semi-structured interviews, reflective activities, and observations.	The results of the study revealed that content and technology controlled students' learning. The study recommends that, for better discernment of mathematics content, personal, and social requirements be addressed via technology. This study seeks for the interweaving of the prescriptive, communal and habitual perspectives, to improve students' performance in mathematics.
Khoza (2018)	Critical action research framed this study, which was conducted on six mathematics teachers. These participants were expected to reflect on their experiences of employing digital technology in the current curriculum. Participants were selected using	The study concluded that the effective implementation of the CAPS using digital technology requires the intensive use of ideologies. This study recommends using philosophical underpinnings to

	purposive and convenience sampling techniques.	generate an effective structure for teaching mathematics. Thus, this study takes an habitual perspective in constructing a mathematics frame.

The above table indicates that the critical paradigm can bring transformation and liberation to AGRIS teachers and to me, as the researcher. The above studies exhibit the significance of intertwining the prescriptive, communal, and habitual perspectives to improve any curriculum. This suggests that harmonising individual, social, and curriculum needs can maintain equivalence within society.

5.6.3 Competences of the critical paradigm in this study

In the context of this study, the critical paradigm could encourage individuals to examine their thoughts and ideas critically (Cohen et al., 2013; Creswell, 2014). This paradigm assisted the participants to think deeply about certain discrepancies and challenges and how to overcome them. Blaikie (2009), Creswell and Poth (2017) postulate that the critical paradigm provides an opportunity to criticise and challenge the status quo within situations or society. In this study, this paradigm did not concentrate on the discernment of teachers' perspectives; however, it emphasised transformation within the society (Cohen et al., 2011). This paradigm could address inequalities that occur within society (Guba & Lincoln, 2005). This is attested to by the studies conducted by Khoza (2018), Khoza and Biyela (2020), Mpungose' (2016a), and Nkohla (2017), who emphasise that, for effective implementation and enactment of any curriculum, the prescriptive, communal, and habitual perspectives should always be considered. The critical paradigm was also competent in addressing power and emancipation within society (Christiansen et al., 2010; McGregory & Murnane, 2010).

Moreover, the paradigm assisted those who felt powerless, oppressed, and restricted by the policies stipulated by the department. AGRIS teachers feel restricted in having to follow the intended content as prescribed. Teachers have to teach to test, without deviating from the

prescribed topics. Interestingly, this paradigm made a tremendous impact by revealing to teachers that they can liberate themselves, taking action to improve their practice.

5.6.4 Overpowering challenges of the critical paradigm

Christiansen et al. (2010) posit that unequal power relations between the researcher and the participants are challenging for the critical paradigm. I overcame this challenge by ensuring that we were all researchers during the whole process, as we were all teaching AGRIS and experiencing similar obstacles. Above all, we were on the same level, and no participant was from the school management team. This indicates that we were all engaged in one purpose: bringing change to our practice. Another challenge for a critical paradigm is bias and manipulation (McGregory & Murnane, 2010). I addressed these challenges by ensuring that I utilised the same questions to all the participants during the data-production process. However, during this process, I asked questions eliciting answers from the subconscious mind; thus, participants were actively involved. Cohen et al. (2013) criticise this paradigm because it has its premeditated political plan. In order to overcome this challenge, I made it my responsibility that, whatever my perspectives of teaching AGRIS, I kept them to myself. This action stimulated active participation. Participants accepted that we had the same knowledge and willingness to contribute for transformation's sake. McGregory and Murnane (2010) postulate that the critical paradigm is embedded in power and social justice, therefore it calls for a qualitative approach.

5.7 Qualitative as the leading approach

The qualitative approach is research producing and analysing holistic data on significant matters utilising adequately effective trustworthy, and ethical approaches and procedures (Jwan & Ong' ondo, 2011). However, this should revolve around humans attaching experiences to real-life situations (Marshall & Rossman, 2014; Punch & Oancea, 2014). Cohen et al. (2007; 2011) postulate that researchers using this approach take a theoretical position (habitual perspective) to comprehend how humans interact and make sense of the world they live in. Scholars like Denzin and Lincoln (2011, 2012), Cohen et al. (2011), Creswell (2013, 2014), Maxwell (2013), and others concur that particular characteristics clarify the qualitative approach. For instance, the qualitative approach focuses on real-life

situations; it employs inductive analysis; its attention is on participants' views and meanings; its importance is on process; it is interested in working with unstructured information, and it concentrates more on reflexivity. This indicates that the researcher can employ a qualitative approach to solve problems that revolve around society, following the systematic procedure to interpret teachers' perspective, which is a prescriptive perspective. This approach advocates a communal perspective in producing information from AGRIS teachers' opinions about their social environment. Ultimately, the qualitative approach includes the self-introspection process, wherein the researcher brings in the habitual perspective on the study.

The qualitative approach was deemed appropriate methodology for this study because it accommodated socially constructed knowledge within a political, social, and cultural setting (Creswell, 2013; Punch & Oancea, 2014; Yin, 2014). This approach provided an in-depth discernment of the multifaceted realistic situation, rather than catering for numerical findings (Cohen et al., 2011; De Vos et al., 2014). Qualitative methodology allowed me to interrogate and discern teachers' perspectives. Teachers introduced their personal experiences and highlighted the barriers that they experience in their real-life situation (Cohen et al., 2011; Creswell, 2009; Taylor* et al., 2015). This study did not use teachers as objects; however, it subjectively observed and measured AGRIS teachers' real-life experiences (Creswell, 2014). In the context of this study, this approach was used to obtain first-hand data directly from teachers while giving their perspectives of teaching AGRIS in schools. In the process of exploring teachers' perspectives, I interacted with six participants through verbal and written information in order to generate actual data and to allow for its interpretation.

Creswell (2009) argues that studies that include human exploratory behaviour become more effective when they occur in a realistic situation. This study employed a qualitative approach to study teachers' behaviour in the problems they experience (Marshall & Rossman, 2014; Mohajan, 2018; Yin*, 2015). Moreover, teachers' behaviour was studied to explain real-life experiences, thus providing meaningful insight (Gentles, Charles, Ploeg, & McKibbon, 2015; Grove, Burns, & Gray, 2012; McMillan & Schumacher, 2010). This study produced data from schools of the participants, to ensure that teachers were familiar with the situation. Further to this, using their realistic setting enabled me to generate an in-depth understanding of teachers' perspectives of teaching AGRIS.

Moreover, the qualitative method was employed to answer the 'what', 'how', and 'why' questions related to teachers' perspectives (Creswell, 2014; McMillan & Schumacher, 2010; Rubin & Babbie, 2016), introducing reasoning and meaning into the study's findings (Eyisi, 2016; Guest, Namey, & Mitchell, 2013). In this case, 'what', 'how', and 'why' questions formed the basis of this study. This approach was considered the most appropriate approach in bringing in corroborations, clarifications, and significant conclusions about teachers' perspectives. For instance, 'what' was employed to bring prescriptive perspectives; 'how' was used to bring communal perspectives; and 'why' was utilised to obtain habitual perspectives of teaching AGRIS in schools.

5.7.1 Competences of the qualitative approach

The qualitative approach assisted the study in obtaining descriptive and meaningful data, and obliged the study to view participants as principal subjects (Denzin & Lincoln, 2011; Maxwell, 2013; Creswell and Poth, 2017). For instance, it brought in-depth discernment of teachers' perspectives. The prescriptive, communal, and habitual perspectives therefore drove this approach to obtain deeper discernment from teachers. This approach enlightened the study about the development of a plan to produce data from participants in a meaning-making procedure. On the other hand, it directed the study to focus on the process, and assisted the study to view AGRIS teachers as core subjects in producing data based on perspectives for teaching the subject in schools. This is in line with Mpungose (2018) who assures that participants are the principal sources of information in qualitative research.

In addition to the above, Marshall and Rossman (2014), Punch and Oancea (2014) contend that meaning is made through human experiences in their natural setting. For this reason, the constructed information brought the understanding of teachers' perspectives in their real-life situations (Gentles et al., 2015; Mohajan, 2018). This advocates for the communal perspective: the study managed to discern the teachers' social, cultural, political, and socio-economic aspects hampering participants' working milieu (Creswell, 2013; Khoza, 2017). According to Denzin and Lincoln (2011, 2012), a qualitative study includes fieldwork. The researcher seeks to visit participants' natural settings to observe and record certain

information. In this regard, I visited all six schools to conduct observations. As a result, I managed to acquire information that assisted me in understanding the challenges that participants encounter in their real-life daily situations. Visiting schools provided me with an in-depth understanding of how do AGRIS teachers apply perspectives during their practice. Therefore, a communal perspective drove this qualitative research. Nonetheless, Creswell and Poth (2017) contend that the qualitative approach possesses its challenges.

5.7.2 Overpowering challenges of qualitative approach

Carr (1994) and Christiansen et al. (2010) highlight that the relationships between the researcher and the participants are the challenges for this approach because relationships can misrepresent results. In this case, the participants and the researcher were at the same level in teaching the subject, and we all shared similar concerns regarding bringing change to our subject. This is in line with Cohen* et al. (2013), that the researcher's presence during the data-production process can influence the participants' responses to the phenomenon. However, this can never be evaded; thus, during data production, I ensured that I gave participants ample time to undertake the reflective activity. During the reflective activity, participants were alone in their respective settings − I was absent. In addition to qualitative approach challenges, Choy (2014) affirms that time-consuming interviews are the challenge of the qualitative approach. To overcome this, each interview session in this study was allocated no more than an hour.

Furthermore, in the qualitative approach, confidentiality and anonymity can pose challenges during the presentation of results. However, in this study, all participants signed consent forms agreeing to participate; participants were informed that pseudonyms were to be employed in place of actual names. According to Cohen et al. (2014), the theoretical paradigm and methodology selected for the study should be in line with the research style. Thus, this study opted for action research.

5.8 Action Research Style for this Study

According to Karim (2001) and Newton and Burgess (2008), the 'action research' was first initiated by Kurt Lewis in 1946. This researcher capacitated other researchers with strategies

to use when investigating fundamental aspects of the social world, daily. Thus, Karim (2001, p. 33) refers to action research as "….*the study of a social situation to improve the quality of action within it*". Likewise, action research involves people who undergo a particular practice, to improve it (Christiansen et al., 2010; Power & Naysmith, 2005). This is in line with Maree (2010) that this type of research promotes a cooperative approach in discovering resolutions to the real problems encountered by participants.

Similarly, Cohen et al. (2013) view action research as the type of research that intends to bring change, and to empower and emancipate participants through their actions, which develop from their experiences of the problem. Furthermore, action research is a practical inquiry that involves participants as researchers during knowledge construction (Baskerville, 1997; Wagemans & Witschge, 2019). Therefore, this type of research allows a researcher to become involved in a social setting and to endeavour to empower and transform society.

This study employed emancipatory action research to empower teachers to improve practice and society's development (Fisher, 2006). This action research permits participants to recognise the challenges exhibited by the AGRIS curriculum, establishing strategies to mitigate them (Fisher, 2006). Furthermore, through action research, I focused on insights and discernment of teachers' perspectives in a realistic situation. At the same time, I recognised how AGRIS teachers view and interrelate with the social world (Wagemans & Witschge, 2019). Emancipatory action research provided opportunities of discerning AGRIS teachers' natural setting and their practice, allowing participants to be at liberty to question their practice (Baskerville, 1997; Neuman, 2014). Emancipatory action research brought liberation and intensive education to AGRIS teachers. The scholars mentioned above insist that action research provides an in-depth understanding of social issues, helping to improve them. This implies that a communal perspective drove emancipatory action research and resonated with one of the objectives of this study, which is to understand how teachers apply perspectives in teaching AGRIS in schools.

Moreover, emancipatory action research also attested to the significance of an habitual perspective, since it seeks individual knowledge and discernment, and how that knowledge

affects one's personality and practice within a particular milieu. Kemmis et al. (2013) argue that individuals are permitted to reflect on their practices in emancipatory action research, questioning their ways of doing things, and providing resolutions after the discernment of their actual situations. This type of research assisted AGRIS participants to discover their identities, empowering them, and allowing them to enhance their teaching. Nonetheless, from an habitual perspective, AGRIS teachers have managed to discover their competencies in the subject, and this has assisted them in overcoming their challenges. This indicates that when individuals understand their identities, the improvement of social life becomes possible (De Vos et al., 2014).

Moreover, Cohen et al. (2013), Creswell and Poth (2017), and others refer to action research as the logical approach usually employed by scholars to reflect on hindrances to change within a particular practice. A prescriptive perspective also drove this action research. In this study, all three perspectives drove action research, namely: the prescriptive perspective (wherein the researcher had to follow a systematic approach in order to find resolutions to a problem); the communal perspective (wherein teachers combined their opinions to improve their practice); and the habitual perspective (wherein personal identity eventually led to teachers being effectual in practice). These perspectives were observed during the reflective activities, observations, one-on-one semi-structured interviews, and focus groups employed during the study's action research. Thus, Power and Naysmith (2005), Cohen' et al. (2007), and Griffiths (2013) assert that emancipatory action research struggles to counter the tyrannical structures and personal restrictions that hamper independence and freedom of teachers. Action research is in a circular form that involves planning, acting, observing, and reflecting stages. In this study, the stage cycles had two phases (see Figure 5.2 below), and both action research phases were employed to bring personal and social transformation to teachers' practice.

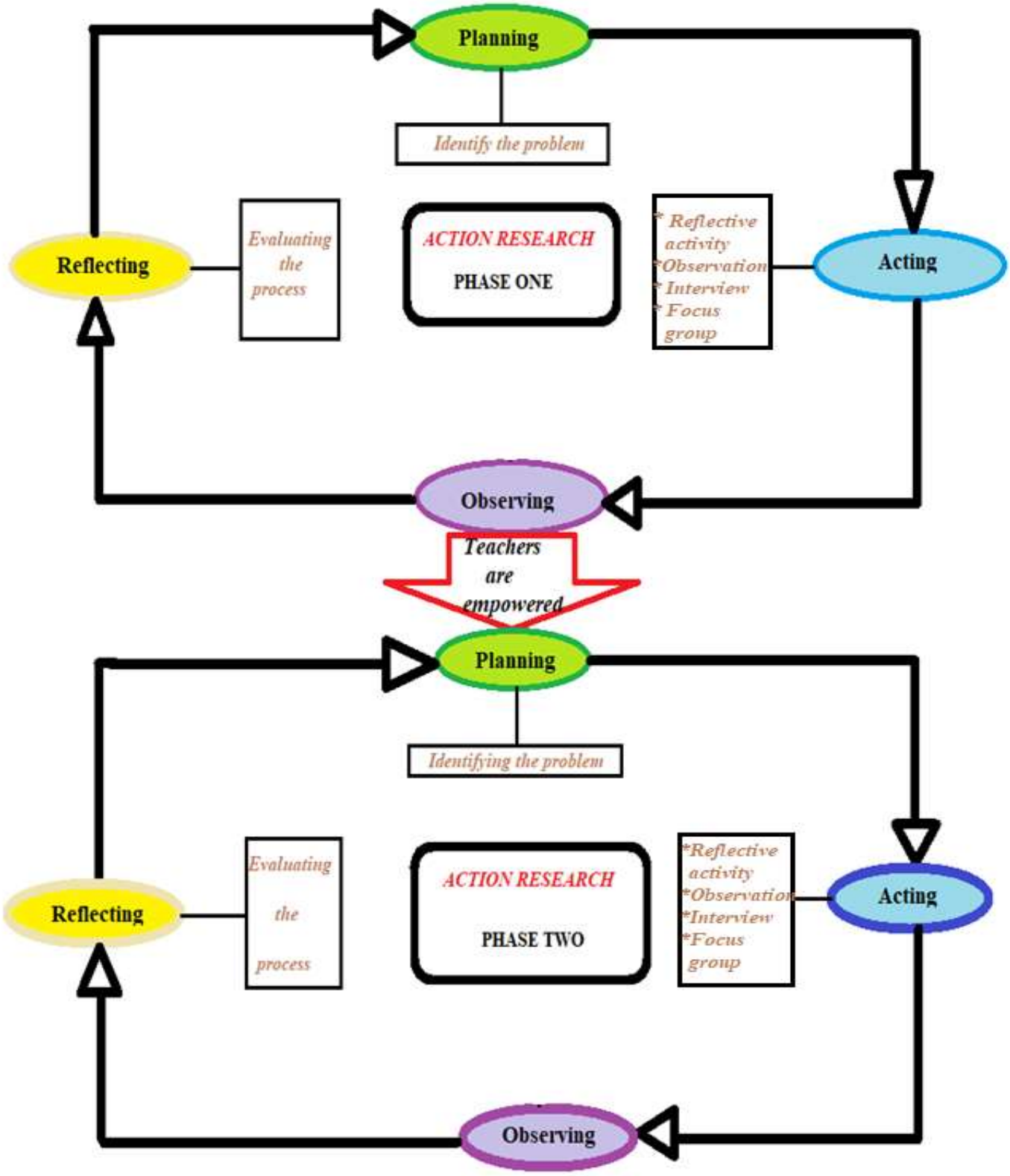

Figure 5.2: Action Research Phases

5.8.1 Phase One of emancipatory action research

We (participants and I) started the planning stage by identifying the challenges experienced by teachers in daily teaching practices. I ensured that I provided directions to participants by posing leading questions such as: 'How do you feel about the teaching of AGRIS?'; and 'What do you think can be done to improve AGRIS practice?.' I did this to ensure that participants were in line with the purpose of this study, which is to explore their perspectives of teaching the subject. Subsequently, we discussed the time frame for the reflective activity, and agreed that the activity would be completed and submitted within three weeks. The questions and data-production methods were constructed and approved, which would explore teachers' comprehensive reflections on their practice.

Moreover, we also discussed how best we could produce appropriate data without disrupting teaching times. After discussions, everyone was committed and aware of what was expected. For us, the planning stage provided the background of the study, and teachers were acquainted with the study's aim to improve and transform the practice. On the other hand, it enabled the study and the participants to prepare for the acting stage.

During the acting stage, I issued reflective activity to each participant to allow every individual to reflect on his or her AGRIS practice. The reflective activity was embedded in the CHAT principles, namely, the tools (teaching aids), subject (teachers), object (content), rules (assessment), community (environment), and division of labour (teaching approach). Participants were expected to reflect on each principle based on the subject they were teaching. Two of my participants managed to complete the task within the stipulated time, although they were not familiar with the principles. By contrast, four of the participants struggled to understand the questions. These teachers contacted me, and I addressed those barriers; thus, they submitted their responses a week after the due date. A prescriptive perspective drove this activity because participants responded to it by bringing in 'what' they practice according to the stipulated policy. After the reflective activity, I conducted classroom observation to obtain in-depth discernment of the phenomenon.

Furthermore, I observed the teacher's teaching to confirm what was written on the reflective activity, viewing the lesson planning to see whether the planning tallied with individual actions. The communal perspective drove observation because it exhibited 'how' an individual uses a particular perspective during practice. The observation was followed by the one-on-one semi-structured interview, which was driven by an habitual perspective. I administered the one-on-one semi-structured interview to delve deep into participants' understanding of the phenomenon, the 'why' questions being employed to guide this interview. Lastly, I conducted a focus-group discussion via the Zoom meeting, which was dominated by a debate between the participants and me. The main aim for this discussion was to encourage social interactions and sharing of opinions, which in turn provided communal, prescriptive, and habitual perspectives for this action research. The completion of this stage (acting) led to the beginning of the observation stage.

During the observation stage, I allowed participants to scrutinise their reflective activities and embark on further discussion. This gave them a good platform for analysing the knowledge they possess on the CHAT principles. This stage provided participants with opportunities to identify the gaps they should bridge to improve their practice. This opportunity allowed participants to reflect on and question the outcome of reflective activities regarding knowledge on perspectives of teaching the subject. In addition, it was observed during reflective, observation, interview, and focus-group discussion that teachers were unacquainted with AGRIS teaching perspectives. Teachers failed to respond appropriately to the CHAT principles, leading to the last stage of Phase One, which is the reflecting stage.

The reflecting stage was critical because we had to reflect on what emerged from other stages to improve our practice. Nonetheless, it became difficult for us to meet so that we could raise our concerns about our inability to know and understand all the factors that underpin the teaching of AGRIS (the CHAT principles). This was because of the Coronavirus pandemic (COVID-19). I decided to send articles that could help teachers understand factors that underpin the teaching of AGRIS, which were rooted in the CHAT principles. I sent those articles via their emails, to which they responded, showing gratitude and eagerness to read them, not knowing most of the principles.

It was essential to revisit the procedure, commencing from the first stage. The second phase of the emancipatory action research was to empower participants to know and discern teachers' teaching perspectives in AGRIS. In a nutshell, action research advocates the use of the prescriptive, communal, and habitual perspectives. Phase one was a diagnostic phase. Thus, emancipatory and empowerment prevailed in Phase Two, which was a transformation phase.

5.8.2 Phase Two of emancipatory action research

Teachers' perspectives were identified as participants' challenges in the first phase, resulting in their inability to respond to the CHAT principles effectively. We focused on three perspectives of teaching AGRIS and the CHAT concepts rooted in each perspective during the planning stage. The articles provided participants with strength, courage, and knowledge to discover their weaknesses in their practice. As a result, they became actively involved during the planning stage, being knowledgeable about teaching concepts that underpin their practice. Thereafter, I emailed them the reflective activity, to be completed and submitted within two weeks.

Surprisingly, all reflective activities were submitted before the submission date. Participants demonstrated an in-depth understanding of their practice concerning perspectives of teaching AGRIS and the CHAT concepts. In their reflective activities, they reflected consciously, as I observed from their reflections on each perspective. The reflective activity prepared the participants for the observations. Interestingly, observations took place via the online platform, on which participants demonstrated how they apply particular perspectives during the teaching of AGRIS. Online observations showed that lessons were planned with broader discernment of a particular perspective, accompanied by the relevant concepts. In this instance, actual practice in their respective classrooms was in line with what teachers had written in their reflective activities. After observations, one-on-one semi-structured interviews were conducted via the online platform Skype to explore teachers' perspectives of teaching AGRIS. Participants proved that they understood the perspectives of teaching as well as factors that underpin their practice. For instance, teachers displayed an in-depth discernment that the prescriptive, communal, and habitual perspectives influence the teaching of AGRIS. Finally, participants were involved in focus-group discussions via a

Zoom meeting, which confirmed that the participants had made significant strides socially and mentally; they were empowered, and ready to transform their AGRIS practice. Thus, during the observation stage, participants reflected critically on their practices and on the factors that underpin them to transform themselves. During the reflecting stage, it was evident that teachers were consciously debating, interrogating, and criticising perspectives that underpin their practice. Action research was therefore most relevant for the improvement and transformation of AGRIS teachers.

5.8.3 The competencies in orchestrating action research

One of the action research competencies is that it encouraged teachers who participated in this study to be actively involved by taking informed actions to improve AGRIS practice (De Vos et al., 2014; Kemmis et al., 2013). An habitual perspective thus drove participants to partake in this study, empowering and transforming each individual. According to Cohen et al. (2013), action research can be utilised in specific fields to bridge the gap between practice and research, permitting researchers to follow a particular procedure. This competence is in line with the prescriptive perspective since, during the action research, the participants and I followed a sequence to improve our practice. De Vos et al. (2014) aver that action research is practical, relevant, and flexible, and promotes teamwork. In the study context, the action research played a significant role because participants worked very hard as a team and were eager to transform and improve their practice on the challenging issues of our subject. This was owing to the communal perspective, as it allowed teamwork from participants; and called for flexibility in finding proper resolutions to all problems encountered. This was observed when participants agreed on reading articles provided, adopting changes to improve their practice. In essence, prescriptive, communal, and habitual perspectives drive action research. However, most studies conducted through action research advocate for personal change, transformation, decolonisation, and empowerment of their practices in the discipline. Thus, the habitual perspective mostly drove the action research of this study.

5.8.4 Overpowering challenges in action research

According to Christiansen et al. (2010), action research findings cannot be generalised since they may yield different results in other contexts. In this study, findings were not generalised

but presented as simple instructions to ensure that they were easily understandable to anyone who read them. De Vos et al. (2014) aver that action research has a challenge regarding ethics. The researchers assert that this type of research tends to put participants' lives in jeopardy in the context wherein the research was orchestrated. It risks revealing participants' names. However, this study avoided such by ensuring that all participants signed consent forms, which stated ethical regulations followed from data production, data analysis, and presentation. Christiansen et al. (2010) posit that unequal power relations between the researcher and the participants are challenges in action research. In this regard, I overcame this challenge by ensuring that we were all researchers during the whole process, as we were all teaching AGRIS at the same level. Most challenges were on the communal perspective, more emphasis being placed on community members. This indicates a gap in challenges that may emerge from prescriptive and habitual perspectives. Further to this, the use of action research contributed to my sampling methods.

5.9 The utilisation of sampling methods

Sampling is the most significant component in ensuring quality in any research (Cohen' et al., 2007; Cohen et al., 2011; Creswell, 2014). Denzin and Lincoln (2011, 2012) argue that researchers should select participants who can contribute satisfactorily during the data-production process. Likewise, Onwuegbuzie and Collins (2007) articulate that the trustworthiness of any study relies on who contributed to data production. Thus, the articulations made by the scholars mentioned above influenced the selection of the sampling methods of this study. For instance, the selection of sampling methods was driven by the phenomenon (teachers' perspectives), the research questions, and the study's data production methods.

Further to the above, Jwan and Ong' ondo (2011), Creswell (2013, 2014), De Vos et al. (2014) contend that, in qualitative studies, samples are constructed guided by purposive or philosophical processes rather than by statistical probability selection (the habitual perspective). These researchers believe that the procedure of selecting the appropriate samples from a population is consecutive and purposive, and not completely pre-determined (prescriptive perspective). Moreover, these studies hold that, because qualitative research participants are actively involved and have their rights reserved, sampling has ethical issues

that can drive the selection of samples (communal perspective). The selection of samples requires researchers to be acquainted with all three perspectives, selecting the most suitable participants for the study. In education research, probability (random stratified sampling, cluster sampling, multi-phase sampling) and non-probability (purposive sampling, convenience sampling, snowball sampling, quota sampling) sampling is employed (Cohen et al., 2011; Creswell, 2009; Maree, 2007). Thus, this study adopted purposive and convenience sampling methods that fall under non-probability sampling.

5.9.1 Application of purposive sampling

On the one hand, purposive sampling is a method whereby the samples are selected to restrict all units of the population's equal chances of being selected (Etikan et al., 2016). On the other hand, purposive sampling is an intentional selection of particular individuals who possess certain qualities of significance to the study (Lodico, Spaulding, & Voegtle, 2010; Strydom et al., 2014; Teddlie & Yu, 2007; Waruingi, 2013). This type of sampling is also known as judgement sampling (Cohen et al., 2011; De Vos et al., 2014; Etikan et al., 2016). This is because it permits the researcher's judgement to choose participants with knowledge and qualities necessary to fulfil the study's purpose. In this regard, my sampling adopted an habitual perspective, since the selection of participants was to meet the researcher's needs. Purposive sampling helped me to select participants with adequate experience on AGRIS who brought an in-depth understanding of teachers' perspectives (McMillan & Schumacher, 2010; Ritchie et al., 2014). I also intentionally selected participants according to their ability to elicit information that is trustworthy and pertinent in addressing the research questions and objectives (Creswell' et al., 2012; Palinkas et al., 2016). This sampling method aided the study to obtain numerous participant experiences from their real-life situation, which brought extensive discernment of teachers' perspectives (Creswell, 2009; Hennink & Bailey, 2011). In this case, sampling was from the communal perspective since participants were selected to sustain the needs of the study.

Furthermore, the purposive method relies on the resources, accessible time, and the objectives of the study (Cohen* et al., 2013; Collins & Hussay, 2009). I had to ensure that I selected only teachers teaching AGRIS for vivid, meticulous exploration of teachers' perspectives of teaching the subject. Nonetheless, I had to select teachers with distinctive

academic and professional qualifications relevant to the subject. Moreover, I selected teachers who had undergone content workshops organised by the Department of Education. Purposive sampling provides superior depth and it focuses on people who are well capacitated with information (Cohen et al., 2011). I selected six well-qualified teachers. However, during the selection process, I considered those teachers who would be better positioned to bring various perspectives of teaching AGRIS in schools. I ensured that qualifications possessed by teachers were authentic and would contribute towards the attainment of the research questions. In this instance, sampling took a prescriptive perspective since participants' selection was based on meeting the subject's needs. Purposive sampling is robust in delving into fundamental knowledge, opinions, life histories, and participants' experiences (Creswell & Poth, 2017; Patton, 1990, 2002). Purposive sampling advocates for prescriptive, communal, and habitual perspectives. Nevertheless, convenience sampling was also employed during participants' selection.

5.9.2 Application of convenience sampling

Christiansen et al. (2010) define convenience sampling as selecting a sample, which the researcher can reach easily. Cohen' et al. (2007), Denzin and Lincoln (2011), Farrokhi and Mahmoudi-Hamidabad (2012), and Hair (2015) describe convenience sampling as the method employed to select participants readily accessible. Cohen et al. (2007, 2013) refer to convenience sampling as accidental sampling because its main focus is on selecting the closest people as the sample. Convenience sampling occurs until the sample reaches the needed size. According to Latham (2007), Bless, Smith, and Sithole (2013), this sampling also involves participants accessible and willing to partake in the study. Thus, an habitual perspective drives this study's convenience sampling because participants were selected based on their accessibility, regardless of their qualities.

Convenience sampling was therefore pertinent to this study. Convenience sampling permitted me to select AGRIS teachers most available in the vicinity and most convenient to reach (Etikan et al., 2016). As a result, I selected six teachers far from my workplace; however, the schools were easy to reach, and those participants were readily available to produce data. These schools were convenient and inexpensive to access. Schools offering AGRIS are scarce and scattered. Four participants were eager to impart knowledge and

displayed interest in the study, while the other two agreed on their consent letters, which gave detailed information about the study. However, any sampling method poses its competencies and challenges.

5.9.3 The competencies of purposive and convenience sampling

Purposive sampling provided the study with participants that possessed in-depth discernment of teachers' perspectives (Creswell, 2007). This supports Etikan et al.'s (2016) assertion that, in this type of sampling, the researcher makes the informed decisions of what is required to be known, and selects pertinent people to provide relevant data under knowledge and experience. At the same time, convenience sampling assisted the study in employing participants readily available and willing to participate (Bless et al., 2013; Farrokhi & Mahmoudi-Hamidabad, 2012). Both the purposive and convenience sampling are inexpensive and not time-consuming (Christiansen et al., 2010; Creswell, 2014). I have spent nothing on recruiting the participants, and I did not spend much time selecting participants that assisted the study to achieve its purpose. In this instance, I contacted all the participants via emails and WhatsApp messages, discussing the purpose of the study during the content workshops. Therefore, the prescriptive, communal, and habitual perspectives influenced participation in this study.

5.9.4 Overcoming the challenges of purposive and convenience sampling

Purposive sampling limited the study to selecting participants without explicit knowledge of teachers' perspectives (Cohen et al., 2011; Etikan et al., 2016). I had to overcome this challenge by selecting teachers teaching AGRIS at the school level. In contrast, convenience sampling could have brought sampling error by selecting haphazardly (Cohen et al., 2011; Saunders & Lewis, 2012). However, the study avoided this because the first choice of sampling was purposive, which was employed to select participants with an in-depth knowledge of AGRIS. This made convenience sampling a second choice to select participants teaching AGRIS who were readily available and reachable for me. Moreover, I have also considered teachers' biographies to overcome various challenges, as presented in Table 5.2 below.

Table 5.2: Teachers' Biographies

TEACHERS	*SUBJECTS*	*YEARS OF EXPERIENCE IN AGRIS*	*GRADES*	*QUALIFICATION*	*GENDER*
Njinji	Agricultural sciences Natural Sciences	07	10-12 09	Secondary Teachers' Diploma	Female
Hloni	Agricultural sciences	12	10-12	Secondary Teachers' Diploma Plus Bachelor of Education Honours	Female
Ralph	Agricultural sciences	18	10-12	Secondary Teachers' Diploma	Male
Popi	Agricultural sciences	23	10-12	Secondary Teachers' Diploma	Female
Saneh	Agricultural sciences Technology	5	10-12 09	Bachelor of Science in Agriculture plus PGCE	Female
Tumelo	Agricultural sciences	10	10-12	Secondary Teachers' Diploma Plus Bachelor of Education Honours	Male

5.10 Unpacking the data-production process

In this study, it was paramount that I employ data-generation methods that would answer the research questions (Csikszentmihalyi, 2011). I had to ensure that the study used appropriate research methods to produce data through the responses given by participants based on teachers' perspectives (Cohen* et al., 2013; Creswell, 2014; Hammond & Wellington, 2013;

Maree, 2010). The selection of data-production methods was based on research questions to achieve the purpose of the study, which is to explore teachers' perspectives of teaching AGRIS in schools. Furthermore, the study employed four methods of establishing an in-depth discernment of the phenomena, enhancing credibility through triangulation, and ensuring this study's findings. Thus, the study opted for reflective activity (prescriptive), observation (communal), one-on-one semi-structured interviews (habitual), and the focus group (habitual and communal).

5.10.1 The practice of reflective activity

In the context of this study, the reflective activity permitted participants to reflect on their teaching practices independently and comprehensively in order to transform and improve themselves and their practice (Mpungose-, 2018). Because participants had to reflect on what they do so that they would change the present and the future, I had to ensure that they responded to predetermined questions on teachers' perspectives (Cohen et al., 2011; Cohen* et al., 2013). Thus, the reflective activity was rooted in the CHAT principles and questions based on knowledge; it assisted participants in reflecting on teachers' perspectives. This activity permitted the participants to reflect on these concepts as they applied them in the current curriculum (CAPS). During this activity, teachers evaluated their past experiences and interrogated their recent experiences, which motivated them to construct new meaning. Reflective activity capacitated the participants and me with courage to unearth innovative actions on the knowledge constructed during the reflection process.

Further to the above, the reflective activity assisted this study in answering the first research question: What are the teachers' perspectives of teaching AGRIS in schools? This suggests that a prescriptive perspective drove the reflective activity. Moreover, it helped identify the gaps between what the participants know and what they do not know (Coghlan & Shani, 2013; Vicary et al., 2016). This activity assisted participants and me in gaining a deep understanding of perspectives underpinning the teaching of AGRIS; and the concepts that contribute towards the effective implementation of the AGRIS curriculum. In this regard, reflective activity was beneficial to stimulate teachers' professional growth through comprehending their genuine practice and discovering strategies to improve it. The use of reflective activity assisted me in identifying teachers' capabilities and blockages; thus,

participants came to understand all the factors that underpin AGRIS practice. The reflective activity had ten questions. Participants had to respond to those questions in writing to give an in-depth discernment of teachers' perspectives (see Annexure E). Participants answered this activity in their space and comfort without any interference and without the presence of the researcher. However, reflective activity had its competencies and challenges in this study.

5.10.1.1 The competencies of the reflective activity

Sending activities via emails without asking for time and physical contact with participants became a competence of the reflective activity in this study (Budden, 2017). This persuaded the participants to respond to the series of questions professionally, which drove the reflective activity towards a prescriptive perspective. Further to this, this activity stimulated profound comprehension about teachers' perspectives, to the extent that teachers' strengths and weaknesses resulted in new knowledge achievement (Mpungose, 2018). For instance, during the second phase, teachers reflected better on their perspectives of teaching AGRIS; teachers even managed to relate to principles framed by each perspective. Nevertheless, this also takes the prescriptive perspective, because teachers had to read provided articles to understand AGRIS perspectives perfectly. Therefore, the prescriptive perspective drives reflective activity more than the communal and habitual perspective.

5.10.12 Overpowering the challenges of the reflective activity

One of the challenges faced by this study during the reflective activity was that participants seemed confused by some of the questions in the activity. However, during Phase One of the planning stage, I explained that should participants encounter difficulties regarding unpacking some of the questions, they were free to contact me for clarification. Therefore, being there for the teachers overcome this challenge. In addition to this, during Phase One, time constraints became a challenge. For instance, participants were given two weeks to complete and submit the activity; however, two participants took longer than expected. In order to overcome this, I was flexible, prolonging the submission date by one week. This permitted participants to complete and submit the activity while allowing me to move to the observation method.

5.10.1.2 The practice of observation

This study opted to take field notes of all participants at their respective work sites (Bertram & Christiansen, 2014b). For this reason, the observation method provided me with the opportunity of generating live data from all six schools (Cohen' et al., 2007; Cohen` et al., 2018; Kruck & Schneiker, 2017; Yin*, 2015). Per this method, I was able to confirm what participants wrote in their reflective activity (Ellis, 2016; Mligo, 2016). Observing participants' natural settings assisted me in generating rich data on teachers' perspectives, in answering the research questions (Cohen' et al., 2007; Hodge et al., 2012). For instance, during observations, I managed to obtain an in-depth and adequate discernment of how each participant interacts in daily teaching (Cohen* et al., 2013; Yanow & Schwartz-Shea, 2013). This provided a precise understanding of what, why, and how AGRIS teachers employ teachers' perspectives in their respective classrooms. However, the generation of the rich information stemmed from the role I played during this acting stage. For example, I decided to be a covert researcher whose role is to observe without being involved in a social relation of actions (Check & Schutt, 2012). This was possible because I conducted this study in schools where learners do not know me.

Most importantly, the observation method assisted me in answering the second research question: How do teachers apply perspectives in the teaching of AGRIS in schools? This method points to the communal perspective more than the prescriptive and the habitual. This is in line with (Creswell, 2007) observation providing direct entrance to intuition and discernment of complicated social relations.

Moreover, two observations were conducted per participant within the two phases of action research, each session being allocated an hour. Notably, the observations in Phase One seemed to lack proper direction, since participants were not knowledgeable about the perspectives of teaching AGRIS. Thus, Phase Two observations occurred via the Zoom platform and provided robust naturally transformative data (Mertens, 2009). Nonetheless, observations permitted me to observe when open-ended questions were framed by the CHAT principles. Questions were semi-structured and open-ended so that I was not limited to the pointers in the observation schedule (see Annexure G). During the lesson observation, I captured all the field notes on how participants apply the teachers' perspective and how they

implement or enact the concepts of the perspective in action. Observations aided me to discern the importance of participants' perspectives on how they view the world and the distinctive ways in which they represent themselves in the social world. However, in the context of the study, observation has its strengths and weaknesses.

5.10.2.1 The competencies of lesson observation

During the participants' actions, my presence was one of the competencies of observations in this study (Creswell' et al., 2012; Creswell, 2014). This study managed to obtain a deep understanding of how teachers behave in real-life settings. I saw how teachers applied particular perspectives during the teaching of AGRIS. Furthermore, this method was flexible because it enabled the study to explore other pertinent factors in addressing other research questions (Merriam & Tisdell, 2015; Yin*, 2015). For instance, the study observation was meant to address the 'how' question and it presented much about 'what' and 'why' questions. Thus, the study managed to produce additional data that also assisted during the interpretation of findings.

5.10.2.2 Overcoming the challenges of lesson observation

Two of my participants threatened to withdraw from the observations if someone came with me to observe their lessons. This presented one of the observation challenges: it is impractical for one person to observe a teacher's actions while jotting down learners' responses (Bertram & Christiansen, 2014a; Christiansen et al., 2010). This study avoided such because the focus was not on learners' learning or their responses. However, it was on teachers' teaching and on how they apply AGRIS perspectives during their daily practice. In addition, all the participants indicated in their consent forms that they were not comfortable with recordings. They agreed to participate in the study, but they prohibited the use of video and audio recordings. However, the study overcame this because I was not an overt researcher but a covert researcher (Check & Schutt, 2012). I therefore managed to capture descriptive field notes while observing. Consequently, detailed notes taken during observations were utilised in subsequent one-on-one semi-structured interviews.

5.10.3 The practice of one-on-one semi-structured interviews

The one-on-one semi-structured interview dominates qualitative research as the most fashionable in generating data (Biggam, 2011). In this study, one-on-one semi-structured interviews were employed as the third method of producing data. The study adopted this method because of its powerfulness and flexibility, which contributed significantly to eliciting in-depth information from participants (Hammond & Wellington, 2013). For instance, through this method, the study captured various ways in which participants made meaning of their experiences in their natural settings (Cohen et al., 2011; McMillan & Schumacher, 2010). Interview questions were open-ended, encouraging participants to develop narratives to all questions in distinctive ways that were optimal to them (Hesse-Biber, 2016). The study opted for open-ended questions because its emphasis was on interrogating teachers' perspectives to obtain an in-depth discernment of the world from individual viewpoints (De Vos et al., 2014). The use of one-on-one semi-structured interviews was productive for the study to answer mostly the second research question. I pursued explicit aspects of concern (personal experiences) that led to focused and constructive contributions (Creswell, 2003).

In essence, the study employed one-on-one semi-structured interviews to answer the third research question: Why do teachers have particular perspectives of teaching AGRIS in schools? The study used this method to draw personal experiences from participants; as a result, the habitual perspective drove one-on-one semi-structured interviews. This assisted me in capturing the personal lived experiences while drawing in-depth information from participants. Tuckman and Harper (2012), Betram and Christiansen (2014), Kruck and Schneiker (2017), and others articulate that questions utilised in one-on-one semi-structured interviews seek background, knowledge, experience, opinion, feeling. What, how, and why questions guide the one-on-one semi-structured interviews. However, the study ensured that this type of interview was employed based on the personal world. As a result, the study concentrated much on the 'why' questions to address the participants' needs and unpack teachers' perspectives. Nevertheless, the study also accommodated several issues (from the social and professional world) created during this interview because participants understood the phenomenon. The habitual perspective dominated the use of one-on-one semi-structured interviews over prescriptive and communal perspectives.

Furthermore, participants were interviewed twice because this is action research, which assisted with enriched data. All the interviews were conducted in the venues selected by the participants. I did this to ensure that participants engaged in self-disclosure and dominated the interview. This is in line with Jenkins, Bloor, Fischer, Berney, and Neale (2010) that this freedom allows the participants to consider themselves important during the process, which leads to enriched data. On the other hand, this granted me an opportunity to listen attentively rather than to speak (Hesse-Biber, 2016). Before the interview, I found it relevant to prepare the participant and to create a conducive atmosphere by discussing common issues of the participant's background instead of going straight into the interview schedule. The CHAT principles guided the interview questions, and the same questions were used for all the participants to generate deeper understanding of teachers' perspectives. This also enriched data organisation and analysis, which in turn restricted the bias of the researcher.

In both phases, before each participant was interviewed, I started by assuring the participants that anonymity would be maintained. After that, I had to explain the purpose of the interview, which aided the study in obtaining intensive data. The duration for each interview session was approximately forty-five minutes long. The interview was less structured and conducted in a language preferred by the participant, and that on its own motivated the participant's composure. Thus, participants provided comprehensive and extensive data on teachers' perspectives. However, three out of six participants interviewed reminded me that they had refused the use of the recording. As a result, interviewing them took longer than expected; I had to question, listen to the extended response, and write what was narrated. At the end of the interview, I had to confirm that what I captured was what the participant had narrated. Interviewing those three participants took almost two hours. However, participants were very patient understanding that they were responsible for the longer sessions. Phase One took place face-to-face; however, Phase Two occurred differently. Because of the Coronavirus pandemic, I had to utilise Skype to interview all the participants. This online platform enabled me to observe participants' body language and facial expressions. The use of semi-structured interviews revealed the competencies and the challenges in this study.

5.10.3.1 Divulging the competencies of the interview in this study

The semi-structured interviews brought specific data that helped provide critical insights that I might have overlooked if using other methods. In this regard, establishing rapport between the participants and me, creating a conducive atmosphere, noting body language and facial expressions assisted the study to obtain further explanations. The flexibility of this method yielded intensive, rich, and pertinent data. For instance, it enabled the study to attain information that also addressed the what and how questions. One-on-one semi-structured interviews were conducted twice; this allowed the participants to adjust and prepare themselves to provide the study with dependable data. This type of interview provided me with an opportunity of deviating from questions asked in Phase One. This assisted the study in probing participants' critical thinking and obtaining a deep understanding. Thus, one-on-one interviews provided the study with explanations and rationalisations that allowed the study to discern why teachers have particular perspectives of teaching AGRIS in schools.

5.10.3.2 Overcoming the challenges of semi-structured interview

In the context of this study, habitual perspectives drove the interviews. This is in line with Christiansen (2010) that participants reflect on their beliefs and behaviours in interviews, leading to self-reported data. This study employed reflective activity, observation, and focus groups to avoid such. Some participants declined the use of audio recording. This became a drawback of this method in this study (Macmillan & Schumacher, 2006). I had to spend overly much time concentrating and listening, so as to write participants' responses accurately. In addition, participants were unfamiliar with Skype use; thus, I had to commence by explaining how the platform works. Nonetheless, participants were excited, to the extent that I had to remind them constantly about the duration of the interview. In this study, one-on-one semi-structured interviews led to focus groups.

5.10.4 The practice of focus-group discussion

On the one hand, focus-group discussions in this study were employed to explore what teachers believe or feel and why they behave the way they do (Rabiee, 2004). On the other hand, focus-group discussions were used to explore the depth and nuances of opinions concerning problems affecting individual teachers, and for comprehending perspectives of

teaching AGRIS (Lunt & Livingston, 1996). The study opted for focus-group discussions to discern what, how, and why teachers employ various perspectives during their daily practice. This aligns with Dilshad and Latif (2013) assertion that focus-group discussions help produce rich data and profound information. However, to attain this, I had to play a facilitator role, while participants acted as respondents (Boddy, 2005). This encouraged teachers to become actively involved during the discussions (Cohen et al., 2011). The focus-group discussion took a direction that moved towards prescriptive, communal, and habitual perspectives. In this study, focus-group discussions were employed to answer research questions, namely: 1) What are the teachers' perspectives of teaching AGRIS in schools?, 2) How do teachers apply perspectives in the teaching of AGRIS in schools?, and 3) Why do teachers have particular perspectives of teaching AGRIS in schools?

In order to achieve the above research questions, I ensured that the focus-group discussion involved the same participants who had been there from the onset (reflective activities, observations, and interviews). This involved six teachers who shared similar experiences, had particular characteristics, and had common knowledge on the subject (Lodico et al., 2010). As a result, the study obtained shared understandings from various teachers while obtaining views from the society that experiences similar problems (Creswell, 2007). The whole discussion was based on open dialogue that elicited significant data and permitted participants to contribute meaningfully. This method provided an ideal platform for further insights by participants as influenced through engagement with other participants. To produce qualitative data that responded to the research question, I ensured that participants gathered in their area of interest that was invigorating and conducive (Betram & Christiansen, 2014; Christiansen et al., 2010).

Unfortunately, owing to the COVID-19 pandemic, the two focus-group discussions were not face-to-face but were conducted via a Zoom meeting. I had to opt for this online platform to ensure that data generation occurred the way it was planned. This method contributed much to this study. Participants were enthusiastic about the digital technology they were exposed to. During the meeting, they were all available and pleased to see other participants via their cell phones. This resulted in active involvement and participation. However, before the

commencement of the focus-group discussion, I had to remind the participants about the purpose of the study. This provided the direction, enhancing group discussion while making the focus group effective. Furthermore, the Zoom meeting also provided empowerment and transformation for the participants and for me. We knew nothing about this type of digital technology, which would improve our practice.

The focus-group discussion was structured around a set of carefully predetermined questions, which were rooted in the CHAT principles (Cohen et al., 2011). The questions were similar to those in the reflective activities, observation, and interview schedules. The study avoided the usage of dichotomous questions that required a yes or no response. Instead, it adopted think-back questions that assisted participants to reflect on experiences and then move forward to their plans (Krueger & Casey, 2014). The discussion was flowing and influenced by thinking and sharing of opinions. Decisions were not made in isolation; participants discussed and shared their concerns and took decisions as a collective (Cohen et al., 2011). For this reason, the study yielded rich information. Thus, this was a transformation process as participants changed their thoughts and opinions during the discussion. A focus-group discussion has two sides, as with other methods.

5.10.4.1 Revealing the competencies of a focus-group discussion

The study's focus-group discussions provided deeper understanding about teachers' perspectives as the participants offered their insights, opinions, and knowledge (Nagle & Williams, 2013). Focus-group discussions presented the prescriptive, communal, and habitual perspectives of teaching AGRIS in schools. The discussions permitted me to capture rich data from participants, all participants being comfortable in their homes while involved in a fruitful discussion. Furthermore, it brought confidence to participants since it was flexible and allowed interactions in the language of their choice (Hennink & Bailey, 2011). The focus-group discussions produced successful and effectual data production for this study, which was quick, easy, and economical to conduct (Neuman, 2009). Further to this, this method stimulated communication amongst the participants while encouraging and empowering them to engage in the open debate based on teachers' perspectives of teaching AGRIS.

5.10.4.2 Overcoming challenges of focus-group discussions

Leedy and Ormord (2005) argue that some of the participants in a focus group may be reluctant to express themselves and may feel overshadowed by the most active ones. This was never the case in this study because all participants became enthused by the digital technology, which encouraged them to become actively involved. Leedy and Ormord (2005), Babbie and Mouton (2008) contend that much valuable data is lost when employing focus-group discussions since it is complicated to take down all the details during the discussion. At the same time, Babbie et al. (2011) argue that it is difficult to identify the participants during data transcription. The use of Zoom meetings avoided this shortfall. During the discussions, I recorded the meeting, which made it easier because there was no need for note-taking. Transcription was also easy because the recording displayed the participants live; thus, it was possible to identify speakers and their responses. Christiansen et al. (2010) and others contend that, after data generation, the researcher must analyse the data obtained.

5.11 The process of data analysis

During qualitative data analysis, I discovered how participants understood teachers' perspectives of teaching AGRIS by analysing their experiences, opinions, and knowledge obtained during data generation (Frick & Laudal, 2017; Grbich, 2012; Maree, 2010). This study's qualitative data analysis was based on making sense of AGRIS teachers' information (Cohen et al., 2011). In order to achieve enriched data that answered all the research questions, the study employed reflective activity, observation, one-on-one semi-structured interviews, and focus-group discussions. Thus, this study opted for qualitative data analysis in order to organise raw data, separate it into distinctive themes, and make the inferences based on findings (Cohen* et al., 2013; Creswell, 2013, 2014; Padgett, 2016; Taylor & Booth, 2015). This is in line with Christiansen et al. (2010), Vithal and Jonathan (2010), Miles, Huberman, and Saldana (2013), Flick (2013) that during data analysis the researcher should condense data, display data, and analyse data qualitatively. This study commenced by selecting information that readers would easily understand. The information was sorted into themes to ease the drawing of the conclusion. The data was interpreted by detecting patterns, explanations, and propositions. The prescriptive (following a systematic procedure), communal (using data generated from participants), and habitual (the researcher

selecting data that may be useful to readers) perspectives drove the qualitative analysis of this study. Thus, the study opted for thematic analysis to analyse the information obtained.

5.11.1 The application of thematic analysis in this study

Thematic analysis (TA) was employed in the form of an approach guided by themes that were modified through data communication (Aronson, 1995; Valsmoradi, Jones, Turunen, & Snelgrove, 2016). TA assisted the study to methodically identify, organise and render insights into themes across data obtained (Braun & Clark, 2012; Javadi & Zarea, 2016). In the quest of analysing textual data, this method also provided the study with a logical procedure of coding and explaining the social realism through the construction of themes (Valsmoradi et al., 2016). This study utilised TA to look for themes that develop from the significant description of teachers' perspectives (Fereday & Muir-Cochrane, 2006). In the context of this study, the fundamental aspect of TA was that the participants' subjective meanings and social realism were relevantly expressed in the findings. Thus, in this study, I had to follow a systematic procedure in organising and coding data. This was followed by considering the participants' meanings and offering insights into themes throughout the acquired information. Alhojailan (2012), Noswell et al. (2017) note that TA provides flexibility for both the deductive process (prescriptive perspective) and the inductive process (communal and habitual perspectives). Thus, an in-depth understanding of TA made it possible for the study to implement a prescriptive perspective while enacting the communal and habitual perspectives during the analysis process.

Fereday and Muir-Cochrane (2006), Braun and Clark (2012), Valmoradi et al. (2016), Javadi and Zarea (2016), Noswell et al. (2017) state that the researcher has to follow six steps or phases to use TA effectively: 1) Familiarizing oneself with data, 2) Generating initial codes, 3) Searching for themes, 4) Reviewing themes, 5) Defining and naming themes, and 6) Producing the report. This was the exact procedure followed by the study during TA. For instance, I first commenced by acquainting myself with the produced data by reading and rereading the textual data. In this regard, I read all the transcripts, studied all the notes taken during the data-generation process, and watched all the Zoom video recordings. While doing this, I made notes on the data and wrote comments in my notebook that might trigger my memory during coding. Secondly, I produced initial codes, beginning with the logical

analysis of data through coding. The reason for generating codes was to decrease the amount of raw data answering the research questions. Thirdly, I associated codes and identified themes across the reflective activities, observations, one-on-one semi-structured interviews, and focus-group discussion transcripts, according to the three data sets, grouping these under headings that precisely connected to the three research questions. Fourthly, I reviewed the potential themes. I did this to verify the themes against the collected data, determining whether the formulated themes worked with the data. Fifthly, I defined and named the themes to ensure that each theme was unique and specific. Doing that enabled me to maintain each theme's focus, ascertaining that themes did not overlap, and ensuring that they answered the research questions. Lastly, I produced the report. This was the final phase in which I had to provide the findings for this study. The TA application therefore involved the sequential procedure wherein the data generated from the participants was categorised into various themes; the conclusion drawn by the researcher followed. Therefore, prescriptive, communal, and habitual perspectives drove the use of TA in this study. However, it is imperative to acknowledge the competencies and challenges of TA.

5.11.1.1 The competencies and challenges in using TA

The TA assisted the study in utilising the codes and themes developed from the data (inductive approach). This provided the researcher with an opportunity of making interpretations. It also allowed the usage of themes and concepts produced by the literature before considering data produced through data-generation methods (Braun & Clark, 2012). This type of analysis became useful in summarising fundamental aspects of the wealth of data obtained. It forced me to undertake a well-designed method of handling data to generate vivid and structured findings (Noswell et al., 2017). One of the challenges of TA experienced by this study is the lack of substantial literature based on this method compared to other methods. However, a six-step approach of conducting TA provided an in-depth understanding of how to apply this method. Below is the discussion of trustworthiness in qualitative studies.

5.12 The establishment of trustworthiness

This study considered trustworthiness issues in exploring teachers' perspectives of teaching AGRIS in schools (Christiansen et al., 2010; Cohen* et al., 2013; Creswell, 2014; Denzin & Lincoln, 2011, 2012). As affirmed by the above scholars, trustworthiness embraced truth and facts that brought neutrality in this study. This study employed trustworthiness to persuade the readers that the presented findings are worthy of attention (Creswell & Poth, 2017; De Vos et al., 2014; De Vos et al., 2011; Guba & Lincoln, 2005; Noswell et al., 2017). Thus, to ensure trustworthiness, this study employed four propositions: credibility, transferability, dependability, and confirmability (Cohen* et al., 2013; Cope, 2014; Denzin & Lincoln, 2011; Guba' & Lincoln, 1994; Yilmaz, 2013).

Credibility in this study ensured that findings reflected realistic and lived experiences of AGRIS teachers (Guba' & Lincoln, 1994). On the other hand, it ensured the accuracy of data produced on the representation of findings to discern teachers' perspectives (Budden, 2017; Mpungose & Khoza, 2017). This study adopted data triangulation (the use of more than one data-production method) to ensure credibility (Cohen et al., 2011; Cohen* et al., 2013). In other words, this study ensured credibility by creating a chain of evidence (Jwan & Ong' ondo, 2011) through reflective activity, observation, one-on-one semi-structured interview, and focus-group discussions. The evidence was obtained through participants' actions; thus, the communal perspective drove credibility in this study. As a result, I allowed teachers to check the findings after analysing the produced data. Data was sent to teachers to verify that direct quotes were their true reflection. This indicates that teachers' voices were considered apropos of the discernment and interpretation of data (Gorard, 2014; van Dongen et al., 2016).

In the context of this study, *transferability* implies that findings could be applied to other teachers with similar experiences but not involved in this study (Cope, 2014; Elo et al., 2014). This study aims to explore teachers' perspectives of teaching AGRIS in schools in two districts around Durban. It employed purposive sampling to select several teachers, to understand teachers' perspectives, and to enhance transferability. The findings of this study can therefore be transferred to other teachers teaching AGRIS in the same context. However,

they cannot be generalised to all schools offering AGRIS around the world. The findings of this study cannot be generalised because each context has varied human factors and situations that could contribute to different findings. Thus, the communal perspective drove transferability in this study.

Dependability in this study had to do with the reliability of data over time in different settings (Cohen et al., 2011; Wellington, 2015). The study confirmed that, if a similar study can be orchestrated in a similar context, that study might yield similar results. This study ensured dependability by allowing participants to verify findings and interpretations, agreeing that they had responded the same during the data-generation process. I had to provide all the participants with the opportunity of reading the discussions, findings, interpretations, and recommendations of the study. This, in turn, provided participants with an in-depth understanding of teachers' perspectives while further empowering themselves. Moreover, this proposition had to do with documenting in a traceable manner, all the records regarding the research process. Thus, the prescriptive perspective drove dependability in this study.

In this study, *confirmability* refers to verification of the findings to ensure that it reflected the discernments of the participants, rather than my prejudices (Cohen' et al., 2007). I ensured that personal dispositions had no impact on the study's results (Bryman & Bell, 2015). This study provided a means of verifying research results. The study offered an in-depth description of the data-production procedure to eradicate personal bias while acknowledging my role throughout the research procedure (Cohen et al., 2011; Jwan & Ong' ondo, 2011). In addition, I made a self-deprecating comment to eradicate prejudices in this study. My supervisor checked to affirm that the findings were in line with the teachers' perspectives (phenomenon) and the research questions. I sent the findings to all the participants to verify what they (participants) had said. Lastly, I took the whole study to an external editor to verify for prejudices, grammatical errors and to check whether the research questions and objectives responded to the purpose of the study. Thus, habitual perspective drove confirmability in this study. Moreover, this study also considered ethical issues.

5.13 The consideration of ethical issues

In any study, ethical and moral principles must be observed (Christiansen et al., 2010; Creswell, 2009). Such principles are considered to protect human dignity and human rights of participants, so that they are not harmed by a study. As a result, ethical issues guided all the participants in this study (Creswell' et al., 2012; Maree, 2010). The researcher carefully and truthfully informed the participants about the purpose of the research, thereafter obtaining their informed consent to be part of the research (Denzin & Lincoln, 2011; Flick, 2013; Markula & Silk, 2011). For this reason, the study considered four principles to adhere to ethical issues, namely: respect each participant's rights (autonomy); do good (beneficence); avoid any harm to participants (non-malfeasance); and ensure equality when dealing with issues (justice) (Christiansen et al., 2010; Cohen et al., 2011, 2013; Creswell, 2009; Gray, 2013). Moreover, the study responded to Creswell's (2012, 2013) call to consider ethical issues prior to conducting this research.

I commenced by recruiting the participants and created an opportunity to gather with them. All the procedures and activities to be followed were explained during that meeting. Prospective participants were provided with study details (purpose, nature, and data-generation methods). Furthermore, I explained participants' responsibilities when in the study and their choice of being video- or audio-recorded. Towards the end of our meeting, participants received informed consent forms to fill if they agreed to partake in the study. This was because participation must be voluntary (Cohen et al., 2011). After that, I applied for ethical clearance from the university research office: this clearance was granted. I also applied for and received the gate-keeping letter from the Department of Education (DoE) Head of Department (HOD) permitting me to conduct this study. In addition, I wrote letters to the principals of each school, asking for permission to conduct this study; all gave consent. I also ensured that participants were protected from any harm (Christiansen et al., 2010; Cohen et al., 2011, 2013; Creswell, 2009; Gray, 2013). I had to discuss every step of the study journey with participants. I elicited their preferred venues and time. Thus, in this study, prescriptive perspective drove ethical issues.

Moreover, I reminded participants about the importance of trust and honesty during this study. This enabled me to observe trustworthiness issues during the sharing of experiences about the perspectives of teaching AGRIS. This contributed a great deal to data analysis and the presentation of the results. In addition, the study maintained confidentiality and anonymity by ensuring that teachers' real names were not used; instead, pseudonyms were employed. Participants were assured that they were not compelled to continue with this study should they rather drop out. This was in line with the voluntary participation ethical principle. I also assured the participants that this study was not meant to judge their practice but rather to explore perspectives of teaching the subject. As a result, there were no judgements made on participant contributions. I informed the participants that this study offered no financial incentives or gain; however, it would assist the transformation of AGRIS practice and the empowerment of teachers, it being action research. In the context of this study, the habitual perspective also drove ethical issues.

5.14 Potential challenges and limitations

This was an action research study characterised by two phases. Phase Two created little conflict amongst participants, who perceived it merely as an unnecessary and time-consuming phase, since they had to repeat what they did in Phase One. To overcome this, I had to repeat myself, reminding participants about their experiences within the subject, the importance of bringing change and improvement, and the beneficial effects of action research. Further to this, I had to explain the significance of employing the same data-production methods, which involved consistency and triangulation.

In addition to the above, the COVID-19 lockdown compelled the study to change how the data-generation methods were to be conducted. For instance, the Phase One focus-group discussion had to occur via a Zoom meeting instead of face-to-face. This created confusion for participants; some were thinking of withdrawing because of digital technology. Some were digital immigrants who were resisting involving themselves. I had to communicate with them and explain that, even to me, a Zoom meeting was a new technique. However, I had learned much about Zoom from the internet; I had to explain how the platform works. Those who were still experiencing challenges received assistance from their family

members. The Zoom platform formed part of transformation and empowerment for participants in this study. However, participants were reluctant to bear costs involved with Zoom, therefore I supported them with their network data. Moving further, Phase Two had to take place using electronic technology. Reflective activities were emailed, one-on-one interviews took place via Skype, and focus-group discussions occurred through Zoom meetings. However, this made Phase One focus group and Phase Two data generation expensive and time-consuming. However, participants grew enthusiastic and comfortable with electronic technology, more so than with face-to-face interactions.

Moreover, this study was restricted to six teachers from two districts around Durban. Therefore, the findings cannot be generalised to other areas of the country. This is because unpredictable variables such as the topographical site of schools and the status quo are not evaluated in this study. However, I had employed a transferability procedure to ensure that the results of this study applied to teachers in the same context who are experiencing similar challenges.

5.15 Conclusion of the Chapter

In the quest to attain the purpose of this study, this chapter expounded on the research design and methodology (research paradigm, research style, sampling, data-generation methods, analysis). This included the competencies and challenges of each method, ethical issues, and the potential challenges of the study. The focus of this chapter was to outline how this study was conducted and how it intended to answer the research questions. This study intended to attain its purpose, which was to explore teachers' perspectives of teaching AGRIS in schools. The prescriptive, communal, and habitual perspectives framed all the discussions in this chapter. The subsequent chapter presents the research findings that were inferred from data produced employing methods delineated in this chapter.

CHAPTER SIX

THE UTILISATION OF PCHP THEORY TO EXPLORE AND DISCUSS FINDINGS

6.1 Introduction

The research design and methodology that unpacked the research questions of this study were discussed in the previous chapter. Chapter Six meticulously presents and discusses findings obtained through reflective activities, observations, one-on-one semi-structured interviews, and focus-discussion groups. The study is framed by a critical paradigm to enhance change in AGRIS practice; the study was conducted in two phases (action research). For this reason, the findings of each phase are discussed distinctly, and the direct quotations are obtained from participants' reflections to ensure authentic responses from participants.

The discussions of these findings are based on the themes that were rooted in the CHAT principles. In this chapter, data analysis is pursued through outcomes (goals), objects (content), division of labour (teaching activities), tools (resources), actors (teacher role), community (background and location), and rules (assessment). Thus, the study employed thematic analysis to categorise patterns into themes. Furthermore, the chapter presents the data analysis of teachers' perspectives of teaching AGRIS in schools. Note that data analysis aims to provide meaning to the produced data from participants, through themes. This chapter seeks to provide answers to the study's research questions, namely: 1. What are the teachers' perspectives of teaching AGRIS in schools?; 2. How do teachers apply perspectives in the teaching of AGRIS in schools?; and Why do teachers have particular perspectives of teaching AGRIS in schools?

6.2 Discussions and Findings of the Study

The comprehensive discussion and presentation of the findings in this study are drawn from the literature, PCHP theory, and the produced data to find the correlation between the three aspects mentioned. This study used pseudonyms to identify the participants and to ensure confidentiality and anonymity − Popi, Njinji, Hloni, Saneh, Ralph, and Tumelo. The

discussion accommodated responses obtained from four data-generation methods in both phases. In addition, the discussion aligns with the themes that are driven by a particular question in every theme.

6.2.1 Teachers' perspectives

- *Why do you have particular perspectives on the teaching of AGRIS?*

  Phase One

  Popi: "*……..AGRIS is one of the subjects [requiring] a specific perspective that will make one accumulate intensive knowledge [and] also develop a passion for the subject. ……. I think I have a passion because at home we grew up cultivating fields……. Being qualified is just a cherry on top".*

  Ralph: *"It was difficult to understand Agric during my school days….my mom applied for me at Esikhawini college……. It was difficult for me at first, but I developed a love for the subject due to more time spent in the fields. It is to assist learners to have a common understanding about growing crops and raising livestock. To help learners to have an understanding of careers they can choose after finishing matric".*

  Hloni: *"I have a passion for Agricultural sciences from high school. I enjoy the subject and want learners to be entrepreneurs. I'm very much acquainted with the curriculum itself……Yah…….that makes me to produce passing learners. ……..".*

  Saneh: *".....I never wanted to be a teacher, I did Agric at Mangosuthu Technicon because I wanted to work for Agri Industry……. [However], due to lack of labour, I decided to do PGCE…….I teach according to ATP…… Now I am a good teacher whom ATP and CAPS document guide."*

  Tumelo: "*……. I use information from textbooks and learners and combine to come up with something solid. ……because of the love I have for this subject, I decided [to] be an Agric teacher to provide learners with all relevant information about Agric careers. ……. Beyond that I wanted to equip learners to become better citizens who are capacitated with knowledge".*

  Njinji: *"……I decided that when I grow up, I want to be an Agric teacher because I wanted to instil a love for Agric to learners so that they will be able to survive in their communities. I teach Agric because it plays a major role in the life of all the people; they can't live without it".*

Phase Two

Popi: *"I have passion for this subject because it is from this subject that we can guarantee our food security and growing economy. I love Agric very much; this love was instilled by my family a long time ago…….. In the way that I have a better understanding of plants and animal life. Truly speaking, it is not easy as a teacher to fulfil your aims in AGRIS because you must make sure that you complete all the topics listed in the CAPS document and ATP in order for learners to pass their exams".*

Ralph: *"I teach Agric to increase job opportunities for learners and encourage them to practice subsistence farming so that the Gross Domestic Product (GDP) will sustain the [country's food security] ….. I have a passion [for] it. As a result, I want to motivate my learner to have an interest and love for it. I want to ensure that they show interest in the subject and pursue any career that involves Agric. …. But there is no time to provide practical skills because there is CAPS document and ATP that I must follow at all times".*

Hloni: *"I am qualified to teach Agriculture and [much] experience enable me to understand the content very well. I enjoy teaching Agric because I've been teaching it for a long time…… I'm aware of its content although it is too much ….to much as it is I always use the ATP and the CAPS document like my bible".*

Saneh: *"PGCE assisted me to understand and be able to use teaching methods. I teach Agric to assist learners to pass though I was not happy to become an Agric teacher, now I enjoy it."*

Tumelo: "*I love and enjoy teaching Agric because it provides life to everyone. Teaching Agric makes me happy because I am helping learners to understand the importance of Agric in life. I teach this subject because I want my learners to pass it with flying colours every year".*

Njinji: *"I always teach this subject to assist learners to [in giving] back to their communities by practicing to their fullest, and I am a qualified teacher with experience. I am teaching Agric because I want learners to grow up an understanding that Agric provide food for their communities therefore, they need skills that can enable them to practice it in their communities. …….. I teach my learners in order for them to give back to their communities, but the information that I read from the documents sent to us clearly states that the use of*

set policies, textbooks, CAPS document addresses the needs of the subject…… Guys, to me, it looks like the department should assist us more about our teaching".

Teachers' perspectives on teaching AGRIS in Phase One are driven by habitual (personal), prescriptive (subject), and communal (social) needs. For instance, Popi and Ralph avowed that AGRIS teaching emerged from passion and love for the subject, and their passion emanated from their families. They teach AGRIS to develop learners' interest in the subject. These affirmations suggest that an habitual perspective influences the teaching of AGRIS when teachers' experiences are at the core of the practice (Czerniewicz & Brown, 2014; Khoza, 2015a, 2016a). In contrast, Saneh stated that her teaching of AGRIS is based on a prescriptive perspective. The account affirms that she follows the CAPS document to the latter, and is guided by the ATP when she teaches. The prescriptive perspective thus drives the teaching of AGRIS when the teacher addresses the subject's needs (Khoza, 2017, 2017b; Le Grange, 2016). In addition, Njinji asserted that her teaching instils a love for the subject, helping to develop their communities through agricultural practices. The communal perspective therefore influences the teaching of AGRIS when the teacher places society's needs at the centre of teaching (Khoza, 2015b, 2016b; Waghid & David, 2016). In addition to that, Hloni and Tumelo's assertions involved personal and professional issues. For instance, their accounts affirm that they have passion for the subject and want their learners to become better citizens. The teachers possess in-depth knowledge of the curriculum. It would seem, therefore, that the habitual, communal, and prescriptive perspectives drive the teaching of AGRIS.

Consequently, Phase One delineated more on habitual, and prescriptive perspectives, and less on the communal perspective. Scholars like Khoza (2015b, 2015c, 2016a, 2016b, 2017, 2018, 2019) and Mpungose (2018, 2019b) assert that particular principles dominate each perspective. For instance, if the prescriptive perspective drives AGRIS teaching, principles such as objectives, hardware tools, instructor action, discipline-centred method, summative assessment, and the face-to-face milieu are employed during the curriculum implementation. The prescriptive perspective addresses the needs of the performance-based curriculum, with vertical knowledge being cascaded (Beinstein, 2000; Bernstein, 1999; Thijs & Van den Akker, 2009). If the teaching of AGRIS is rooted in a communal perspective, principles apropos of indigenous knowledge, learning outcomes, software tools, facilitator actions, the

learner-centred method, peer assessment, and an online milieu are enacted during the lesson presentation. By comparison, principles such as teacher knowledge, aims, ideological-ware, researcher actions, teacher-centred method, formative assessment, and blended milieu are dominant in an habitual perspective. The habitual perspective addresses pragmatic-based curriculum needs, wherein diagonal knowledge is embraced; while the communal perspective addresses competency-based curriculum needs wherein horizontal knowledge is embraced (Beinstein, 2000; Bernstein, 1999; Thijs & Van den Akker, 2009). Phase Two occurred after participants were issued with articles to read in order to capacitate themselves. Phase Two is characterised by empowerment and transformation.

During the second phase, participants exhibited an in-depth discernment regarding the perspectives (prescriptive, communal, and habitual) of teaching AGRIS. For instance, they managed to discover on their own that as much as they have a passion (habitual) for the subject and are eager to see their learners giving back to their communities (communal), AGRIS is driven by standardised guidelines (prescriptive perspective). This is in line with teachers' responses that they have to adhere to the CAPS document and the ATP in order for learners to pass. Therefore, teachers who address the subject needs are influenced by the performance-based curriculum. As a result, teachers ignored their passion and community involvement, being only conscious that AGRIS requires them to follow set policies. This was evident during classroom observations; all participants introduced their lessons by asking questions based on the previous content; and used the lecture method during their teaching. Some provided learners with questions seeking learners to recapitulate knowledge taught during the previous lesson. Some teachers used activities from learners' textbooks to find out whether they understood the content. This suggests that the teaching of AGRIS is rooted in the prescriptive perspective; thus, qualified teachers must place the needs of the subject at the centre of teaching in order to cascade vertical knowledge (Beinstein, 2000; Bernstein, 1999; Hoadley & Jansen, 2012; Hoadley & Muller, 2009).

6.2.2 Outcomes

- *Towards which goals (outcomes) are you applying perspectives to teach AGRIS?*

  Phase One

Popi: *"Teaching AGRIS should aim at producing quality products that will guarantee the sustainability of our lives and growing economy. My goal is to produce independent learners……. Who can be able to use Agric to earn a living".*

Ralph: *"….I teach according to aims. ……important for learners to achieve what I've been teaching them. ……. I always have an aim of what my learners have to achieve".*

Hloni: *"I teach Agric to ensure that learners know Agricultural industry as it provides the main source of income and employment. I am teaching using objectives because I have to make sure that I cover what is in the syllabus".*

Saneh: *"My teaching is always according to the ATP. ……. Every time I ensure that I know what my learners have to know during a lesson".*

Tumelo: *"I teach learners to achieve something and to have the practical side of Agricultural sciences. …… I want to see my learners make informed decisions about the career they want to follow. I want to [ensure] that the number of learners doing Agric increases and will make South African economy increase".*

Njinji: *"I teach to change and reach all learners or tap into everyone's potential to be able to apply Agric in practice. My teaching always focuses on aims because I always concentrate on teaching content [so that it will] benefit them and their communities. CAPS document has general aims. This makes it difficult for me to formulate specific aims".*

Phase Two

Popi: *"I aim to develop learners' awareness about rearing plant and animals for a living. Agric has prescribed lesson plans with objectives; therefore, my teaching is always based on objectives. [Nevertheless], I never pay attention to those objectives because I use to consider them unimportant. …… the documents that we received from you opened my eyes".*

Ralph: *"I teach Agric [intending to see] my learners becoming farmers of the future. I am an Agric teacher who wants to ensure that food security is sustained in our country. I never noticed that the teaching of Agric is based on objectives until I read those documents, my problem now is to know how to formulate [simple] aims and outcomes since objectives are provided".*

Hloni: *"I always teach using objectives. I usually concentrate on objectives because, in every lesson, learners should know something. …… during every lesson, I use one or two questions from previous question papers to check whether my objective is met".*

Saneh: *"I teach these learners in order for them to pass Agric with good marks. …… I always ensure that learners master and able to differentiate concepts taught to them. It quite clear that I am using objectives for teaching Agric".*

Tumelo: *"Besides wanting my learners to pass, I also teach them to be able to survive using their skills obtained in Agric. They must be able to integrate what I taught them in class with what they see or observe in their communities".*

Njinji: *"I am teaching them to see them being productive [soon]. Ehh…… I want my learners to go to universities to do Agric and come back to use the skills obtained to uplift their communities".*

Goals are classified into aims to address personal needs (habitual), outcomes to address social needs (communal), and objectives to address subject needs (prescriptive). The CHAT principles grounded this study, most emphasising outcomes (communal) while accommodating other propositions that drive other perspectives. For instance, during Phase One, Popi, Ralph, and Njinji indicated that their teaching was based on aims; while Hloni, Saneh, and Tumelo cited that their teaching was always steered by objectives (perspective). This implies that the habitual and prescriptive perspectives drive their teaching of AGRIS.

Njinji: *"My teaching is always focusing on aims because I always concentrate on teaching content in a manner that it will benefit them and their communities*".

This pronouncement indicates that Njinji's focus is on aims while addressing the needs of the community. Teachers apparently lack understanding of the difference between aims and outcomes. However, teachers' responses indicated a lack of understanding of outcomes, outcomes not being mentioned in any explanations.

However, during the transformation phase (Phase Two), the teachers displayed much better understanding of propositions that drive their teaching. For example, Popi and Ralph's AGRIS teaching is rooted in an habitual perspective because their focus is on developing learners' interest in AGRIS, which can be attained through aims. During this phase, these participants exhibited an in-depth understanding that objectives are grounded in the prescriptive perspective and drive AGRIS teaching.

Tumelo: *"Besides wanting my learners to pass, I also teach them to be able to survive using their skills obtained in Agric".*

Njinji: *"I am teaching them in order to see them being productive in the near future ….. want my learners to go to universities to do Agric and come back to use the skills obtained to uplift their communities".*

These accounts serve as an indication that knowledge is inadequate without skills. This suggests that Njinji and Tumelo support teaching that addresses subject needs (objectives) and social needs (outcomes). Nonetheless, during the transformation phase, teachers' assertions were dominated by the use of objectives. This suggests that objectives drive AGRIS teaching.

Ralph: *"My problem now is to know how to formulate everyday aims and outcomes since objectives are provided."*

Teachers' inability to formulate aims leads to unsuccessful construction of outcomes. This is in line with Mpungose's (2018) affirmation that aims are the foundation of practical construction of explicit learning outcomes. The AGRIS curriculum restricts the use of specific aims and outcomes, although in AGRIS such is paramount according to the Department of Education (2012) on the teaching of the subject. The DoE stipulates that teachers equip learners with adequate knowledge (objectives), skills (outcomes), and attitudes/values/interests (aims). Therefore, AGRIS teaching requires objectives to assist in cascading knowledge to learners. Learning outcomes must ensure that learners are capacitated with relevant skills and aims to develop learners' interest in the subject. AGRIS as a subject places more emphasis on knowledge, limiting the acquisition of skills and values.

6.2.3 Objects

- *What are you teaching via perspectives?*

Phase One

Popi: *"I'm teaching Grade 10 only this year due to the increased number of learners doing Agric. I'm teaching them Agro-ecology, Agri-industry, Population growth, Climate change, Agric legislations, Soil Sciences, Animal Sciences, Plant Sciences, and Biological concepts".*

Saneh and Njinji indicated that they are teaching Grade 11, in which the content is as follows: *Chemistry, soil sciences, organic and inorganic fertilisers, plant sciences, biotechnology, optimal resources, and utilisation.* However, during the focus-group discussion, Saneh, Ralph, and Hloni highlighted that they are experiencing greater challenges regarding chemistry teaching. They always rely on physical sciences teachers to teach this chapter for them. They recommended that the Department of Education organise workshops based on how to teach chemistry. Hloni, Tumelo, and Ralph are also teaching Grade 12. They indicated their content as animal nutrition, animal production, animal health and diseases, plant poisoning, basic genetics, production factors, agricultural marketing, entrepreneurship, and management. However, during the focus-group discussion,

Tumelo: *"I have a concern about basic genetics, this is complicated to me…how much more to my learners. Every time I rely on Life Sciences teachers to deal with this section in Life Sciences so that I deal with it as revision using previous question papers".* Saneh concurred with Tumelo: *"What Tumelo is saying is true; this section has complicated concepts that are confusing even to us".*

Popi: *"….. Agric scope is broad in Grade 12 when you compare it with other subjects. Those responsible for Agric should remove other topics and spread them across other Grades".*

Phase Two

During Phase Two, all participants indicated what they were teaching as they did in Phase One.

Tumelo: *"I'm still concerned about how we can make changes to our subject because the system itself does not allow us to be involved during curriculum planning. But I am hoping that our voices will be heard via this study".*

According to the CHAT, the object can address the subject needs (content), personal needs (teacher knowledge), and social needs (indigenous knowledge). This implies that the prescriptive perspective addresses content, the habitual perspective unpacks teacher knowledge, and the communal perspective focuses on indigenous knowledge.

Both phases showed that teachers are only well acquainted with content knowledge. This was evident when they all managed to list the topics covered in their respective grades. For example, Saneh and Njinji indicated that they are teaching Grade 11. The content is as follows: chemistry, soil sciences, organic and inorganic fertilisers, plant sciences,

biotechnology, optimal resource, and utilisation. Hloni, Tumelo, and Ralph are also teaching Grade 12. They indicated their content as animal nutrition, animal production, animal health and diseases, plant poisoning, basic genetics, production factors, agricultural marketing, entrepreneurship, and management. However, Mpungose (2018) states that the planning of the object (e.g., the AGRIS object) should involve knowledge (content), skills (indigenous knowledge), and attitudes (teacher knowledge). A prescriptive perspective should drive the inculcation of the content knowledge, including the communal perspective, to instil various skills. An habitual perspective would impart interests and values. However, the teaching of AGRIS is driven by objectives, which are addressed via knowledge only. Thus, the AGRIS object requires teachers to be steered by a prescriptive perspective for the inculcation of knowledge to learners.

Teachers were confident about the AGRIS object (content) and vocal about the specific impediments. For instance, Grade 11 teachers indicated challenges regarding chemistry teaching; thus, they rely on physical sciences teachers. This is attested to by the studies conducted by King (2012) and Wilshart (2016) on the complexity of chemistry for teachers. For this reason, Nixon, Campbell, and Luft (2016) argue that chemistry needs to be taught by teachers with a degree in chemistry who are well acquainted with its content. As a result, the teaching of chemistry in AGRIS becomes an extra burden to physical sciences teachers, because they have to teach this section for AGRIS teachers. This suggests that chemistry requires vertical knowledge, which draws from the performance-based curriculum. However, Van Duzor (2012), Garner, Siol, and Eilks (2015) aver that the teaching of chemistry should also accommodate diagonal knowledge grounded in teachers' experiences (habitual) and horizontal knowledge rooted in learners' knowledge gained from their socio-cultural environment (communal). The teaching of chemistry thus requires prescriptive (knowledge), communal (skills), and habitual (interests/values) perspectives.

Likewise, Grade 12 teachers rely on life sciences teachers for the teaching of basic genetics. The studies conducted by Stern and Kampourakis (2017), Cebesoy and Oztekin (2018) focus on complexities and misconceptions in the teaching of AGRIS. The researchers have suggested various tactics of handling the difficulties of teaching genetics at the secondary level, recommending that teachers extend their knowledge of genetics through professional

development programmes. However, the study conducted by Dawson and Venville (2010) on high school genetics indicates that socio-scientific issues contribute greatly towards a better understanding of genetics. Therefore, horizontal knowledge is of significance in the teaching of genetics. The teaching of basic genetics draws from the prescriptive and communal perspectives in which vertical and horizontal knowledge become dominant to address the needs of the performance- and competency-based curriculum.

6.2.4 Teaching methods

- *What teaching methods do you use during the teaching of AGRIS?*

Phase One

Popi: *"I use narrative method and question and answer method to get what they know. I always ensure that I am teaching them every day; the only time they become active is [asking] questions. Sometimes I group them, but the group works waste time because classes are overcrowded ……. I also use question and answer".* Ralph outlined that, *"I use presentation, question and answer and individual and group work. I always give them instructions on what they are supposed to do; then learners have to follow and as they are instructed. I sometimes let them take control of their learning, but Agric scope makes me in charge mostly".*

Hloni: *"I employ different strategies e.g lecture method ……. Allow learners to do group work or discussions as well as pair work and facilitate the process. I prefer the drilling method because of the wide scope of Agric. Learners get their chance to express themselves and their understanding via homework and formal tasks. In fact I prefer the lecture method".*

Saneh: *"I usually instruct learners on what to do, but I also think that this goes hand in hand with the lecture method that I prefer. The method that works perfectly for me is teacher-centred, where I dominate the lesson to ensure that they grasp the knowledge I have planned for the day".*

Tumelo: *"I use demonstration, lecturing and practical work. ….. I prefer to use my Agric period by myself using the lecture method. …… but I prefer to teach in order to complete the syllabus on time. …… during study periods, I use group work and demonstration method".*

Njinji: *"I use group discussions, inquiry-based and direct instruction. I always believe that teaching learners in a class are not enough. That is why I teach them even during the*

weekends to complete the syllabus. I give them group work to do after school hours while using the school contact time to teach them……".

Phase Two

Popi: *"I use teacher-centred and content-centred method but sometimes learner-centred and group work".*

Ralph: *"I believe in content-centred and learner-centred. ….. I do not use learner-centred regularly because it takes too much time that the subject [does] not have".*

Hloni: *"I use all the methods such as teacher-centred, learner-centred and content-centred".*

Saneh: "*….. it seems as if I was confused all along because I have been using teacher-centred as content centred. It means that I always use content-centred method because it assists me to finish my work on time".*

Tumelo: *"By the look of things……. I am always using learner-centred and content-centred methods".*

Njinji: *"I've been using teacher-centred, learner-centred and content-centred without noticing. I always thought that when I'm teaching content to learners, I am using teacher-centred, now I know the difference between the three".*

Teaching methods are methods employed by teachers during teaching to attain discipline objectives and to assist learners in achieving learning outcomes, while enabling the teacher to fulfil his or her aims (Boundless, 2016; Killen, 2015; Shih, 2002). For instance, when teachers draw from the prescriptive perspective, they use the content-centred method. Teachers dominated by the communal perspective use the learner-centred method, with teachers driven by an habitual perspective employing the teacher-centred method.

The lecture, question and answer, demonstration, and group-work methods dominated Phase One (diagnostic stage). The lecture method is a verbal presentation of concepts, facts, or information on a particular subject. It is the quickest and easiest way of teaching an overcrowded class (Aruna & Thenmozhi, 2014; Giridharan & Raju, 2016).

Popi: *"……. because classes are overcrowded"*.

Saneh: *"…..to ensure that they grasp the knowledge I have planned for the day*."
Tumelo: *"……I prefer …… lecture method…..to complete the syllabus on time".*
Teachers therefore employ lecture methods to disseminate vertical knowledge and to teach a large class easily.

By comparison, demonstration permits the teacher to be the core actor of logical demonstration with learners as observers during the whole process (Adekoya & Olatoye, 2011; Auwal, 2013; Ekeyi, 2013). Likewise, the demonstration method addresses the needs of the subject. Lecture and demonstration methods are predominantly content-centred methods employed to teach AGRIS in schools. Such might be those adopted by lecturers during teacher training programmes. This is confirmed by the findings obtained from the study conducted by Balschweid, Knobloch, and Hains (2014) investigating lecturers' perspectives of teaching AGRIS (animal sciences and plant sciences). Findings indicated that lecturers employ lecture and demonstration methods since these methods enhance instructional delivery through textbooks, journals, and laboratories.

Further to the above, the transformation phase (Phase Two) displayed a remarkable improvement regarding teaching methods. For instance, during Phase One, all participants mentioned lecture, question and answer, demonstrations, and group work as their methods. During Phase Two, teachers displayed a better understanding of teaching methods proposed. Teachers understood that lecture and demonstration are content-centred methods; and group work, which they use occasionally, is a learner-centred method. In essence, teachers used to confuse teacher-centred with content-centred; however, this action research eliminated most misconceptions. Thus, a prescriptive perspective drives teaching methods in AGRIS, which hinders teachers from producing learners with adequate skills and values. This suggests that methods employed during AGRIS teaching align with the performance-based curriculum and prioritise good academics. Consequently, this attitude hampers an interest in pursuing an agricultural career, owing to a lack of acquired skills.

6.2.5 Division of labour

- *How are you applying perspectives during teaching and learning?*

Phase One

Popi: *"I usually use learner-centred activities. I develop activities from previous question papers and their textbooks to train them for the exams. I give them home works, class works, class tests, projects, assignments, practical investigations".*

Ralph: *"I make sure that the lesson is not teacher-centred by continuously asking learners questions to participate. I use previous question papers as well as activities from Focus and Study & Master textbooks".*

Hloni: *"I normally use teacher-centred and learner-centred activities. ……. all the activities are from the previous question papers".*

Saneh: "*I always take all the activities from previous question papers".*

Tumelo: "*I enjoy demonstrations. I prefer allowing my learners to bring their views about the topic which are in line with their real-life situations".*

Njinji: *"I spend much time on my laptop trying to look at previous question papers. ……. I categorise questions from every topic then form an activity bank that I use for activities".*

Phase Two

Popi: *"…… so I use previous question papers for all activities……".*

Ralph: *"I give them home works and class works which are from different textbooks. I use previous question papers to formulate class tests, practical investigations, projects, and assignments are from our cluster. Common tests exams are from the provincial department".*

Hloni, Saneh, and Njinji showed similarities with Ralph. They proclaimed that they used textbook activities, and class tests formulated from previous provincial and national question papers. They followed this trend to assist learners to pass standardised tests and examinations.

During the focus-group discussion,

Tumelo: "*……. Then later, I'll post activities from previous question papers to our school Agric WhatsApp group, and they will respond to that individual. Group work is only applicable during practical work at the laboratory".*

This implies that Tumelo is employing content and learner-centred activities during the teaching of the subject.

Effective teaching is characterised by how labour is divided during the implementation and enactment of the curriculum. For instance, content-centred activities capacitate learners with adequate knowledge; learner-centred activities are responsible for skills development; while teacher-centred activities escalate interest and attitude of learners towards the subject (Mpungose-, 2018; Thijs & Van den Akker, 2009). Both phases reflected that the division of labour draws either from prescriptive or communal perspectives. Teachers' responses involved the formulation of activities using previous question papers, and activities available in the textbooks. Content-centred activities therefore dominate the teaching of AGRIS. Teachers highlighted that they use previous question papers to drill learners for the provincial and national examinations. Therefore the South African AGRIS curriculum is driven by the performance-based curriculum, with teachers having to 'teach to test' every time.

Tumelo: *"I prefer allowing my learners to bring their views about the topic which are in line with their real-life situations."*

The acceptance of views and life experiences is in line with a communal perspective and should be addressed by learner-centred activities. However, during classroom observations Tumelo's teaching was dominated by the lecture method, and question and answer method, wherein learners had to respond with textbook content. This suggests that what Tumelo stated during one-on-one interviews was not in line with what was observed.

Tumelo: *"Group work is only applicable during practical work at the laboratory."*

Group work is a learner-centred activity, dominated by views and opinions that address social needs. However, the teacher becomes the core actor in the laboratory by following the systematic demonstration while learners observe to imitate what the teacher has demonstrated. The CAPS document therefore falls short. The CAPS document is silent about the division of labour (content-centred, teacher-centred, and learner-centred activities).

Hloni: *"I normally use teacher-centred and learner-centred activities. ……. all the activities are from the previous question papers".* These accounts indicated that teachers are unaware of what activities driven by teacher-centred and learner-centred.

Tumelo: *"…….later I'll post an activity from previous question papers to our school Agric WhatsApp group and they will respond to that individually".*

This account suggests that Tumelo employs a social platform (software) to disseminate content-centred activities, to which learners respond individually from vertical knowledge. However, an individual content-centred activity does not indicate learner-centred activity.

Moreover, it was surprising that not all the participants were aware of teacher-centred and learner-centred activities. AGRIS teachers seem to be driven by a prescriptive perspective when dividing labour. The teaching of the subject is therefore in line with imparting knowledge only, as articulated by the CAPS document through content-centred assistance for learners to pass exams. The Department of Education (2012) stipulates that AGRIS in South Africa teaching should provide learners with adequate knowledge (content-centred activities), skills (learner-centred activities), and attitudes/values (teacher-centred activities). This indicates the vulnerability of the South African AGRIS curriculum. This resonates with what is articulated by Berkvens et al. (2014), that any curriculum with one proposition missing may fail.

6.2.6 Tools

- *With what are you teaching when applying perspectives?*

Phase One

Popi: *"I use different textbooks, chalkboard, flyers, charts, and sometimes overhead projector."*

Ralph: *"I use teaching aids such as chalkboard, textbooks, worksheets, previous question papers, Farmers' weekly and laptop. ……. Sometimes I use printed slides for learners because we don't have a data projector at school".*

Hloni: "*I use video clips, ATP and CAPS document".*

Saneh: " *I use my laptop, Focus and Viva Textbooks, previous question papers, chalkboard, ATP and CAPS document."*

Njinji added internet pictures.

Tumelo: "*I use computer or laptop, projector, laboratory, charts, social media, and chalkboard".*

Phase Two

During this phase, participants responded with the same tools as in Phase One except for Saneh and Tumelo. These teachers added DVDs and PowerPoint presentations from the Association for African Agricultural Educators (ASSAE). According to Khoza (2012, 2013a, 2014a, 2015a, 2015b, 2015c, 2016a, 2017b, 2018), Mpungose (2018), Kisaka-Jwan (2019), tools are categorised into HW, SW and IW. The above researchers concur that HW tools (computers, laptops, tablets, videos, overhead projector machine, slide projectors, tape recorders, textbooks, chalkboard, charts, worksheets, question papers, and others) are driven by a prescriptive perspective to address the subject needs. Conversely, SW tools (overhead projectors transparencies, PowerPoint slides, CD, DVD, YouTube, Facebook, e-books, Google, Yahoo, emails, Microsoft Office, and websites) are driven by a communal perspective to address social needs. Finally, IW tools (theories that have to do with personal beliefs) are driven by an habitual perspective to address personal needs.

More teachers indicated textbooks, chalkboards, previous question papers, ATP, and the CAPS document as their daily-use tools. These accounts suggest that HW tools are most prevalent in the teaching of AGRIS, in addressing the needs of the subject. A few teachers mentioned overhead projectors, printed slides, computers, laptops, and laboratories. Most teachers utilise tools that place content at the centre to unpack the performance-based curriculum needs. This suggests that the teaching of AGRIS is dominated by HW tools that drive teachers to address subject needs. At the same time, these tools help to capacitate learners with scientific knowledge. Thus, the AGRIS curriculum favours vertical knowledge, which is driven by the performance-based curriculum. During focus-group discussions, Saneh and Tumelo proposed the use of CDs, DVDs, and PowerPoint presentations from ASAAE, which are the software tools that address social needs. Tools such as DVDs, and PowerPoint presentations, are declared by Khoza (2012, 2013a, 2014a, 2015a, 2015b, 2015c, 2016a, 2017b, 2018), Mpungose (2018), and Kisaka-Jwan (2019) SW tools. Teachers employ these tools to address social needs (learners), steered by a communal perspective. However, in this regard, SW tools mentioned by teachers are provided by ASAAE in order to unpack the content electronically. This contrasts with SW tools characteristics, employed by learners to raise and share their opinions about a subject. SW tools are in line with the competency-based curriculum, and draw from horizontal knowledge. This indicates

confusion about the discernment of tools' propositions, how tools differ, and why they are used.

In both phases, teachers were silent about IW tools even though provided with adequate information on tools. However, the IW tool is of importance to any curriculum because it addresses the teacher's needs and assists the teacher in discerning the subject and society's needs (Khoza, 2015b, 2015c, 2016b). Thus, teaching is not only about HW and SW but also about personal beliefs or ideology. Teachers must discern the IW tools that underpin the AGRIS curriculum. Therefore, ideological principles (pragmatic-based curriculum) are crucial for the AGRIS curriculum to balance the performance- and competency-based curriculum (Khoza, 2017; Mpungose, 2020b). The AGRIS curriculum may collapse through confusion between the use of HW and SW, when employed without IW. The absence of IW underpinning the teaching of AGRIS may contribute to the South African AGRIS curriculum failure. This indicates the absence of a theory to guide teachers in implementing HW tools driven by the performance-based curriculum. The tools employed by AGRIS teachers are rooted in the prescriptive perspective, isolated from other perspectives when presenting the needs of the subject.

6.2.7 Actor's role

- *How are you facilitating teaching in the classroom?*

Phase One

Popi: *"I always start from what they know to what they don't know. I use instructional method, where I instruct, and learners do as I say and sometimes allocate some work to do in groups".*

Ralph: *"I present the lesson to learners and use TAMC method (Teaching, Assessment, Marking and Corrections. ……. I give my learners work to do individually and during that time I move around monitoring them".*

Hloni: *"I explain the content to learners while writing chalkboard summary for them to copy*."

Saneh: *"I use to introduce the topic to learners, instruct them on what to do and write notes on the board and expect them to copy them. I use the lecture method it works for me perfectly. In my class, you won't hear any noise; learners used to be quiet and listening to my teaching".*

Tumelo: *"I use to explain the topic in detail and guide the learners to do the work. I provide direction on what learners are expected to do".*

Njinji: *"The enrolment of my school is very high …….. lecturing method works for me because it assists me to reach all learners. During the class period, I use the instructional method. However, during the weekends, I use the monitoring method because that is where my learners get time to discuss issues that concern themselves about the subject matter taught during the week".*

Phase Two

Popi: *"In most cases, large numbers in our classes prevent me from using group discussions, but it is possible to convey knowledge by being an instructor".*

Ralph: *"During my period I instruct learners to listen to my presentation. ……. when they write an activity, I eventually move around to ensure that there is no one copying from the other".*

Hloni: *"The dominant role during my teaching of Agric is that of an instructor where I use lecturing method mostly. Facilitating is something I do if learners [prepare] for quarterly exams where I give them time to discuss the work in groups".*

Saneh: *"……. I used to be an instructor…..[However], if I observe that I have been explaining, but learners seem like failing to understand, I choose a high flyer to come forward and explain same concepts to the class".*

Tumelo: *"…… I become an instructor to cover the scope, but during the study period, I become a facilitator because learners work on their own whether through computers or social media".*

Njinji: *"During teaching I become an instructor because I have to explain everything to my learners……. After school hours, I ask learners to assist each other on the work done during our period; this means I only act as a facilitator after hours".*

During the implementation and enactment of any curriculum, the teacher can act in distinctive ways. A teacher can be an instructor driven by objectives in order to address the subject's needs; a facilitator driven by learning outcomes to unpack society/learner's needs; or a researcher driven by aims to address the teacher's needs (Khoza, 2015c, 2016a, 2017b, 2018; Mpungose, 2020b). This suggests that prescriptive (instructor), communal (facilitator) and habitual (researcher) perspectives may influence the role played by the teacher.

The diagnostic stage of this action research did not indicate how some teachers act during the teaching of AGRIS. However, during observation, it was apparent that teachers act as instructors. During other data-generation methods, some indications brought light to each role played by the teacher.

Popi said: *"I use instructional method, where I instruct, and learners do as I say and sometimes allocate some work to do in groups".*

Saneh: *"I use lecture method it works for me perfectly, in my class, you won't hear any noise, learners used to be quiet and listening to my teaching".*

Njinji: *"During the class period I use instructional method, but during the weekends I use monitoring method because that is where my learners get time to discuss issues that concern them about the subject matter taught during the week".*

These accounts articulate that the teachers mentioned above act as instructors during their practice. This suggests that teachers act this way to assist the learners to learn the AGRIS concepts more accurately (Frisby & Martin, 2010; Kamaravadivelu, 2003). During the transformation stage, teachers were clear about their actions during the teaching of the subject. Teachers all stated that they act as instructors in their respective classrooms. This indicates that AGRIS teachers act as instructors and are driven by set policies that provide the content teachers should teach in a standardised manner, thus addressing the subject's needs.

Moreover, it was disappointing that only one teacher (Tumelo) stated: "….*during the study period I become a facilitator because learners work [independently] through computers or social media"*.

This account indicates that teachers are confused about the role they should play during their practice. Computers are one of the HW tools employed to address the subject's needs, wherein the teacher acts as an instructor. While WhatsApp is one of the SW tools utilised to address the society/learner's needs, the teacher acts as a facilitator. Nevertheless, according to Kolb (2014), one of the facilitator's actions is to facilitate teaching by creating a conducive milieu for learners. In this way, learners can reflect on and make meaning of their daily life experiences during their discussions. This resonates with Couso et al. (2015) articulation that a facilitator should challenge the ideas that arise from learners' discussion to provide feedback, which is impossible using only computers. The facilitator role draws from a communal perspective to unpack learner/social needs.

Further to the above, none of the participants mentioned the researcher's role. A prescriptive perspective therefore drives AGRIS teaching to address the subject needs, which aligns with the performance-based curriculum. A researcher is characterised by improved knowledge, skills, attitudes, beliefs, and values obtained from teacher education and personal experiences (Day et al., 2006; Samuel & Van Wyk, 2008; Tam, 2015). A researcher can bring in self-knowledge, using self-knowledge during teaching, owing to in-depth capacitation from professional development. Thus, the researcher's actions can assist the teacher in making informed decisions about the teaching process. This suggests that researcher's actions draw from an habitual perspective to address teachers' needs. However, teachers' confusion about facilitator and researcher actions is an indication that the South African AGRIS CAPS document has deficits in teaching according to a discretion principle: it is silent about how teachers should act during the teaching of AGRIS.

6.2.8 Community

- *With whom are you when applying perspectives?*

Phase One

Popi: *"I teach learners who have been carefully selected and have interest in the subject. These learners want to make a permanent career out of the subject. I teach learners from various backgrounds; most are from poor and middle, and [fewer] are from stable families. …… sometimes it is useless to teach in English throughout the lesson……"*

Ralph: *"I teach learners from poor backgrounds, but I try to communicate with them in English and encourage them to master scientific terms in our content."*

Hloni: *"I teach learners who are doing all the science subjects and mathematics. The school is located in a poor environment, and most of them are from homes headed by their grandmothers. These learners are from squatter camps, and most of them fail to understand English, [making] it difficult to teach in English."* Saneh declared that *"I'm teaching learners from poor households, but I make sure that I teach in English. ……. but I don't want to kill my learners because they may fail to understand instruction during final examinations."*

Tumelo: *"Most of the learners in my school are not from the surrounding areas. ……. I always teach them in English and show no difficulties understanding because they are from educated families and have access to various media communications."*

Njinji: "*Ohh…… we are in an environment that is a mixture of squatter camps and RDP houses……. Parents are struggling a lot. My school is under section 21, and learners receive food every day."*

Phase Two

Popi: *"…… learners are not from the same background, some are from [low-income families] and some are from homes with a teacher or a nurse. So when I teach, I consider that and explain the content in English and IsiZulu. ….. is not allowed, but it is for them to understand……"*

Ralph: *"….. I understand the community that I'm serving …… Agric is supposed to address what the community requires but instead, [we teach] what is prepared for us. The way things are with our subject, I don't think that we as teachers [give] giving the society what it needs."*

Hloni: *"I know that I cannot assist my learners in terms of catering their needs or that of their communities due to the nature of Agric, we teach what is set for us. I always ensure that I use English and IsiZulu to make sure that they understand……."*

Saneh: *"……. I use English throughout my lesson because the ATP specifies that teachers should use English Across the Curriculum (EAC). …… papers are written in the same English for all schools in South Africa".*

Tumelo: *"…… learners in my school are from [good] families because it is a private school. It is within the school policy that we teach learners in English, and we encourage them to work independently*". Njinji: *"……. I teach in a rural area where some learners are heads of their households. But I cannot reach out to all of my learners [to address] their community needs because they have to write [standard] tests at the end of each term. This makes me not deviate from the syllabus or spend time exposing learners to practical work".*

Education that restricts learners/society from having access to a curriculum would serve a futile goal. This is in line with the Department of Education (2012) and Berkvens et al. (2014) that every learner has a right to education irrespective of his or her status (race, language, culture, gender, and others). Teachers have to be acquainted with learners' experiences and cultural backgrounds to provide learners with relevant knowledge that addresses their needs. McAlpine et al. (1996) and Gates (2006) opine that science subjects are not the presentation of the pedagogy; instead the subjects are a social construct constituted by social forces, social needs, and conventions. Therefore, the teaching thereof should not be within the individual but within cooperative and social dimensions whereby interaction and human activity take place. Thus, science teachers should be well capacitated with social and political rationale, because social knowledge evokes the discipline knowledge discernment.

Teachers utilised prescriptive, communal, and habitual perspectives to respond to their community backgrounds during both phases. Teachers articulated more on the use of language and culture to address the needs of the learner/society.

Popi: *"…… learners are not from the same background, some are from [low-income families], and some are from homes with a teacher or a nurse. So when I teach, I consider that and explain the content in English and IsiZulu. ….. is not allowed but it is for them to understand….."*.

Hloni: *"I know that I cannot assist my learners in terms of catering their needs or that of their communities due to the nature of Agric, we teach what is set for us. I always ensure that I use English and IsiZulu to make sure that they understand……."*.

Popi and Hloni understand issues of inequalities within diverse communities; thus, they employ an habitual perspective to address learners' needs. These teachers understand that students from low socio-economic environments have difficulties understanding English, which is why they prefer code-switching. Furthermore, Hloni and Popi's articulations indicate that they are aware of social needs; however, the curriculum boundaries are tight restraints. Nonetheless, this contrasts with what is stipulated by the AGRIS CAPS document that during AGRIS practice teachers should consider English across the curriculum (EAC).

Ralph: *"….. I understand the community that I'm serving …… Agric is supposed to address what the community requires, but instead, we are teaching what is prepared for us. The way things are with our subject, I don't think that we as teachers [give] the society what it needs"*.

Njinji: *"……. I teach in a rural area where some learners are heads of their households. [Nevertheless], I cannot reach out to all of my learners in terms of addressing their community needs ……"*

These accounts indicate that the South African CAPS curriculum degrades teachers' professionalism by dictating what to teach without adjustments. This resonates with what is articulated by Msibi and Mchunu (2013) and Feldman* (2016) that the CAPS curriculum fails to address fundamental aspects that are contemporarily facing South African communities. The CAPS curriculum fails to recognise teacher professionalism, instead viewing teachers as mere technicians. Unpacking social needs emerge from curriculum loopholes, which create a gap between curriculum developers and what transpires within communities (Phaeton & Stears, 2017). Therefore, understanding or not understanding the community is an understatement in the teaching of AGRIS. It seems that the AGRIS curriculum disregards society, and renders society's needs worthless.

Moreover, the pronouncements made by Saneh and Tumelo indicate that they use language (English) to address the needs of the discipline. These two teachers adhere to the norms and standards of the performance-based curriculum to ensure that learners know scientific terms.

Saneh: *"I use English throughout my lesson because the ATP specifies that teachers should use English Across the Curriculum (EAC)."*

Tumelo: *"It is within the school policy that we teach learners in English and we encourage them to work independently."*

These accounts suggest that teachers should adhere to the rules and regulations set by the department. Teachers should know that the prescriptive perspective drives knowledge obtained from schools to put the performance of the AGRIS curriculum at the centre of teaching (Bate, 2014; Hoadley & Jansen, 2012). This requires teachers to be driven by content knowledge (objectives), which aligns with the performance-based curriculum. Thus, the AGRIS curriculum tends to ignore the development of skills (learning outcomes), which is in line with competency-based curriculum and personal growth (aims) driven by the pragmatic-based curriculum.

6.2.9 Teaching environment

- *Where are you teaching when applying perspectives?*

Phase One

Popi, Hloni, Saneh, Ralph, and Njinji reported that they teach in the classroom environment. In addition, Tumelo was the only one who stated: *"I use face-to-face and social media."*

Phase Two

Five participants (Popi, Ralph, Hloni, Saneh, and Njinji) responded with face-to-face teaching during this phase. However, Tumelo professed that *"I use face-to-face and online, which is called blended learning."*

The accounts from the diagnostic (Phase One) and transformation stages (Phase Two) draw from the prescriptive perspective; all participants agreed that AGRIS teaching occurs in classrooms (face to face). Khoza (2019a), Khoza and Biyela (2020), Mpungose (2020a) concur that a face-to-face environment addresses the subject needs and aligns with the performance-based curriculum. The teaching environment is classified into face-to-face (prescriptive); online learning (communal) which addresses social needs; and blended

learning (habitual) which addresses personal needs (Khoza, 2017b, 2017c, 2019a; Khoza & Biyela, 2020; Mpungose, 2020a). Face-to-face teaching is the instructional teaching in which the instructor's actions in the classroom facilitate learning and sanction an ideal cognitive learners' evolvement (Sanchez-Rosas & Esquivel, 2016). The teacher acts as an instructor to cascade the vertical knowledge drawn from a face-to-face environment. Thus, in the AGRIS curriculum, face-to-face environments are of paramount importance, which drive teachers to a prescriptive perspective.

Further to the above, Tumelo highlighted that *"I use face-to-face and social media."* Tumelo was the only participant who mentioned the online and face-to-face environments (blended learning). The online milieu allows teachers and learners to communicate via various social media to share various opinions on the subject (Mpungose, 2020b, 2020c). A communal perspective drives the online milieu to address the learner/society's need, and it draws from the competency-based curriculum. However, during the exploration of the concept (division of labour), Tumelo delineated that, *"…….later I'll post an activity from previous question papers to our school Agric WhatsApp group, and they will respond to that individually".* Tumelo's account indicates that he employs the online environment to push the boundaries of the performance curriculum. This suggests that AGRIS teachers are unaware of the propositions that unpack the teaching milieu. In essence, a face-to-face environment dominates the teaching of AGRIS in addressing the needs of the subject.

6.2.10 Rules

- *How do you assess your teaching when applying perspectives?*

Phase One

Popi: *"I give learners worksheets to work on. I also give them assignments in the form of scientific research. They write formal tests and examinations on the work covered."*
Ralph: *"I assess my teaching through classwork and homework. ….. I also use other methods like practical investigation, project, assignments, tests, and exams."* Hloni: *"I engaged learners to group activities, individual tasks, tests, informal tasks. They write tests every Fridays, and I make worksheets for every topic. I give them four activities per week as per our subject policy*."

Saneh: *"I give my learners home works and class works, but I always avoid giving them group works because I don't want them to copy each other's work. …. I give them class tests from previous question papers to drill them for the common test."*

Tumelo: *"Every day I give them homework or classwork using questions from their textbooks or previous question papers. I always give my learners feedback on every work that they have done.* During focus group discussions, Tumelo raised his concern that *"I am still not satisfied that you don't use the demonstration method …. I can give you practical tasks that you can do without using the laboratory."*

Njinji's responses were similar to those of Saneh: *"……. Home works and class works…… every Fridays they write class tests with questions from previous question papers to prepare them for the common exams."*

Phase Two

Popi: *"I always consider informal assessment in the form of homework, classwork and class tests…. Sometimes I allow learners to mark their homework or classwork, and this is peer assessment. The department provides formal assessment like exams and formal tasks are coming from our cluster".*

The responses obtained from Ralph, Hloni, Saneh, Tumelo, and Njinji are in line with Popi. All participants indicated use of the informal (homework, classwork, class tests), and the formal (exams are from the province and tasks are from their different clusters) to ensure that they push the boundaries of the performance-based curriculum. They all referred to peer assessment as informal work that learners themselves mark.

According to Thijs and Van den Akker (2009), Bennett (2010), Khoza (2013b), Ngubane-Mokiwa and Khoza (2016), assessment rests on three pillars: the formal/summative (assessment of learning), driven by objectives to address the subject needs; the formative (assessment for learning), framed by learning outcomes to unpack learner/social needs; and the peer (assessment as learning) assessment, steered by aims to address personal needs. This suggests that formal assessment is aligned with the performance-based curriculum and is rooted in vertical knowledge. The formative assessment is aligned with the competency-based curriculum driven by horizontal knowledge. Peer assessment is in line with the pragmatic-based curriculum and draws from diagonal knowledge. The performance-based curriculum encompasses knowledge issues. The competency-based curriculum is embedded

in skills development. The pragmatic-based curriculum caters to all the fundamentals related to attitudes/values.

There was no clear indication that teachers better understand informal and peer assessment proposition during the diagnostic stage, and this was detected in their distinctive accounts. None of the participants managed to respond to all three assessment types. However, it was detected from their accounts that a prescriptive perspective drives their form of assessment.
Popi: "*I also give them assignments in the form of scientific research."*
Tumelo: *"Every day I give them homework or a classwork using questions from their textbooks or previous question papers*."
Hloni: *"I give them four activities per week as per our subject policy*."
All of the above articulations are in line with South African AGRIS policy document and directly indicate assessment of learning (formal assessment). This suggests that AGRIS emphasises the product, which pressures teachers to adhere to specific teaching procedures, thus completing the prescribed content on time, while assisting learners to perform well in their exams. Popi, Hloni, Popi, and Saneh use previous question papers to formulate class tests that learners write every Friday to prepare them for provincial and national exams. Therefore, AGRIS teachers employ formative assessment, which is content-driven, with the purpose of testing and grading, quarterly and yearly (Department of Education, 2011; Hoadley and Jansen, 2012, Khoza, 2013b; Berkvens et al., 2014; Peden, 2015).

Saneh: *"…..I always avoid giving them group works because I don't want them to copy each other's work. ….."*
According to Subramaniam (2013), Killen (2015), Hay and Nilsson (2016), Rido, Nambiar, and Ibrahim (2016), group work is an active social collaboration in which learners combine their own experiences, such as home experiences, in order to understand the content. Learners from a closer proximity can bring socially constructed knowledge to class. Group work should bring horizontal knowledge for better discernment of vertical knowledge. Horizontal knowledge draws from a competency-based curriculum, which is driven by learning outcomes. For this reason, assessment as learning (peer assessment) is paramount, being driven by opinions that address social/learner needs (Khoza, 2017b, 2018; Kisaka-Jwan, 2019; Maba & Mantra, 2017; Mabuza, 2018). AGRIS teachers tended to avoid group

work during their practice. Saneh was the only participant who mentioned the word group work: teachers seem to be disregarding other forms of assessment.

The transformation stage displayed much difference as opposed to the diagnostic stage. Teachers showed understanding about propositions of assessment although they seemed shocked and confused. For instance, they all stated that informal assessments (formative) are homework, classwork, and class tests. This suggests that formative assessment is the type of assessment that is not recorded in school-based assessment (SBA), according to teachers. However, as the formative (assessment for learning) disregards provision of marks for learners' performances, its emphasis is on identifying learners' needs and weaknesses during teaching, so that learners are adequately prepared for assessment of learning (Mokhtar & Adnan, 2017; Yorke, 2003). The focus is on feedback and the constructive method, which in turn calls for the teacher/learner experiences (Bhagat & Spector, 2017; Box et al., 2015; Decristan et al., 2015; Ismail & Mohammad, 2017; Nicol & Macfarlane-Dick, 2006; Rushbon, 2005). AGRIS teachers should frequently utilise this assessment to diagnose and respond to learners' needs, thereby improving learners' understanding of the content. The use of homework, classwork and class tests constructed from textbooks/previous question papers may be futile in improving AGRIS practice.

According to Kulkarni et al. (2013), Harrisson et al. (2015), Maba (2017), and Mpungose (2018), peer assessment has to do with learners assessing other learners' work using the preordained criteria. This is powerful assessment, and capable of addressing social matters. Such emerged from the account of all the participants that learners mark homework, classwork, and class tests that were extracted from textbooks and previous question papers. This does not align with the ideas of the above scholars: textbooks and previous question papers only address the needs of the subject. AGRIS teachers seem to lack a better understanding of how peer assessment is employed. AGRIS teachers use formative and peer assessment for the wrong reasons. This calls for intense professional development on why and how formative and peer-assessment should be enacted. Therefore, AGRIS assessment is not driven by the habitual and communal perspectives, but only by the prescriptive perspective.

6.3 Conclusion of the Chapter

This chapter depicted the perspectives of six teachers regarding the teaching of AGRIS in schools. The discussion and analysis of produced data were rooted in PCHP theory, and categorised according to various themes, namely: teachers' perspectives, outcomes, objects, teaching methods, division of labour, tools, actors, community, teaching environment, and rules. The findings indicate that influences from prescriptive perspectives dominate AGRIS teaching. However, as the prescriptive perspective is driving teachers, they were transformed. Teachers recognised at the end of this action research the need to include communal and habitual perspectives to improve their practice. The next chapter (Chapter Seven) provides answers to the study research questions, theoretically discusses the findings, and provides the recommendations based on the findings generated.

CHAPTER SEVEN

RECONTEXTUALIZATION OF THE FINDINGS WITHIN RELEVANT LITERATURE AND THE SOUTH AFRICAN AGRIS CURRICULUM GAPS

7.1 Introduction

The previous chapter (Chapter Six) presented and discussed the findings obtained during the data-generation process of the study. This study has sought to explore teachers' perspectives of teaching AGRIS in schools in two districts of KwaZulu-Natal. Chapter Seven provides a theoretical stance on the entire study in an outline of the research questions based on the findings. This chapter presents teachers' perspectives on bringing in philosophical analysis. The chapter directly responds to the following research questions: What are the teachers' perspectives of teaching agricultural sciences in schools? How do teachers apply perspectives on teaching of agricultural sciences in schools? Why do teachers have particular perspectives of teaching agricultural sciences in schools? Furthermore, this chapter intends to combine emerging principles from the literature in the development of a theory for teaching AGRIS. Therefore, presenting the AGRIS curriculum theory for teaching leads to the study's conclusions and recommendations.

7.2 First Research Question

What are the teachers' perspectives of teaching AGRIS in secondary schools?

The findings from data generated indicated chiefly that the impetus for teaching AGRIS draws from a prescriptive perspective. Habitual and communal rationale prevailed among some teachers, but did not influence the decisions made during the teaching of AGRIS. During the teaching of AGRIS, teachers followed the annual teaching plan (ATP) and AGRIS CAPS document to the latter; thus, teaching took into account the subject needs. This was followed by the use of textbooks and previous provincial and national question papers. It is in the nature of the prescriptive perspective that teachers place professional experiences at the centre of teaching (Khoza, 2018; Mpungose, 2020a). Teachers are responsible for developing learners' cognition through vertical knowledge (Berkvens et al.,

2014; Bernstein, 1999). The use of prescribed documents and textbooks promotes a vertical discourse, which involves conceptual teaching (specific concepts) and objectivity (specific language and grammar) (Hoadley & Jansen, 2012; Hoadley & Muller, 2009; Peden, 2015). This suggests that teachers should be qualified and proficient in the subject.

The subject known as AGRIS is driven by a prescriptive perspective, which requires teachers to adhere to professional dynamics of teaching. Teachers place the subject's needs at the core, using the performance-based curriculum as the systematic structure. The performance-based curriculum prioritises examinations and tests of content knowledge, while accentuating the specific standards for achievement (Hyndman & Pill, 2016; Rotidi et al., 2017). Teachers act as mere technicians to cascade planned content knowledge. The prescriptive perspective is generated from the performance-based curriculum to enhance knowledge and planned content, rather than to develop comprehension and critical thinking. Teachers caught up in this perspective make vigorous efforts to inculcate knowledge, coercing learners to pass with good grades. These teachers may be producing learners who have impractical knowledge, causing them to remain dependent for life. For instance, teachers may produce learners dependent on being employed who cannot establish their own businesses due to lack of application skills. Learners may know that livestock is categorised into ruminants and non-ruminants. Learners may know how to feed ruminants, but not know the value of livestock and the relevant skills that encourage independence. Such learners may come to rely on industries for employment. The prescriptive perspective tends to disempower teachers, as they have to disregard learners' needs and social needs, and adhere to subject needs.

7.2 Second Research Question

How do teachers apply perspectives in the teaching of AGRIS in secondary schools?

In order to unravel this question, I adhered to what the PCHP theory articulated, which is in line with the CHAT principles. The PCHP theory suggests that a prescriptive perspective allows teachers to apply principles such as objectives, content knowledge, hardware tools, instructor actions, a discipline-centred method, summative assessment, and a face-to-face milieu. The communal perspective permits teachers to employ principles such as outcomes,

indigenous knowledge, facilitator actions, the learner-centred method, peer assessment, and the online milieu. By comparison, an habitual perspective authorises teachers to use the following principles: aims; teacher knowledge; researcher actions; teacher-centred method; formative assessment; blended milieu. Therefore, the conclusion on how teachers apply perspectives when they teach AGRIS depended on the dominant perspective. Note that, to address all the research questions, I employed action research categorised into two phases.

During Phase One, teachers were unaware of curriculum principles, therefore taught according to their discretion.

Njinji, on perspective: *"……I decided that when I grow up, I want to be an Agric teacher because I wanted to instil a love for Agric to learners so that they will be able to survive in their communities. My teaching is always focusing on aims because I always concentrate on teaching content in a manner that it will I future benefit them and their communities. I use group discussions, inquiry-based and direct instruction. I spend much time on my laptop trying to look at previous question papers. ……. I categorise questions from every topic then form an activity bank that I use for activities. The enrolment of my school is very high …….. lecturing method works for me because it assists me to reach all learners. Teaching is taking place in their classrooms. We don't have laboratories for practical work we rely on books. Home works and class works…… every Friday they write class tests with questions from previous question papers to prepare them for common exams".*

These accounts indicate that Njinji is unaware of curriculum principles that underpin her perspective. Concluding Njinji's accounts, her teaching is influenced by a communal perspective. However, she misapplies her perspective by not balancing the principles that drive her perspective. According to Thijs and Van den Akker (2009), Van den Akker, Branch, Gustafson, Nieveen, and Plomp (2012), Berkvens et al. (2014), any curriculum should underpin perspectives for quality assurance. This stance affords balance, coherence, relevancy, consistency, practicality, and sustainability of each principle. If not so, the curriculum will disintegrate and crumble (Berkvens et al., 2014). Not knowing curriculum principles may indicate a distorted curriculum.

In addition, in the transformation stages, teachers understood the nature of the AGRIS curriculum and became acquainted with principles embedded in its perspectives. The findings indicated that teachers were confused about communal and habitual perspectives and unfamiliar with prescriptive perspectives, making it easier for them to associate and clarify the principles underlying their teaching. The prescriptive perspective places subject needs at the centre of teaching, and is based on objectives, content knowledge, hardware tools, instructor actions, a discipline-centred method, summative assessment, and the face-to-face milieu. The findings further indicated that the ATP and the CAPS documents drive the teaching of AGRIS, thereby pushing the boundaries of the performance-based curriculum. The above principles drive the performance-based curriculum, while allowing teachers to drill learners to grasp content knowledge. Teachers usually disseminate instructions using appropriate teaching activities and teaching tools. This method permits teachers to grade learners according to their performance. In this regard, the assessment is conducted to indicate whether the learner fails or passes the subject/grade. Therefore, the current AGRIC curriculum principles are revealed in the CHAT in Figure 7.1 below:

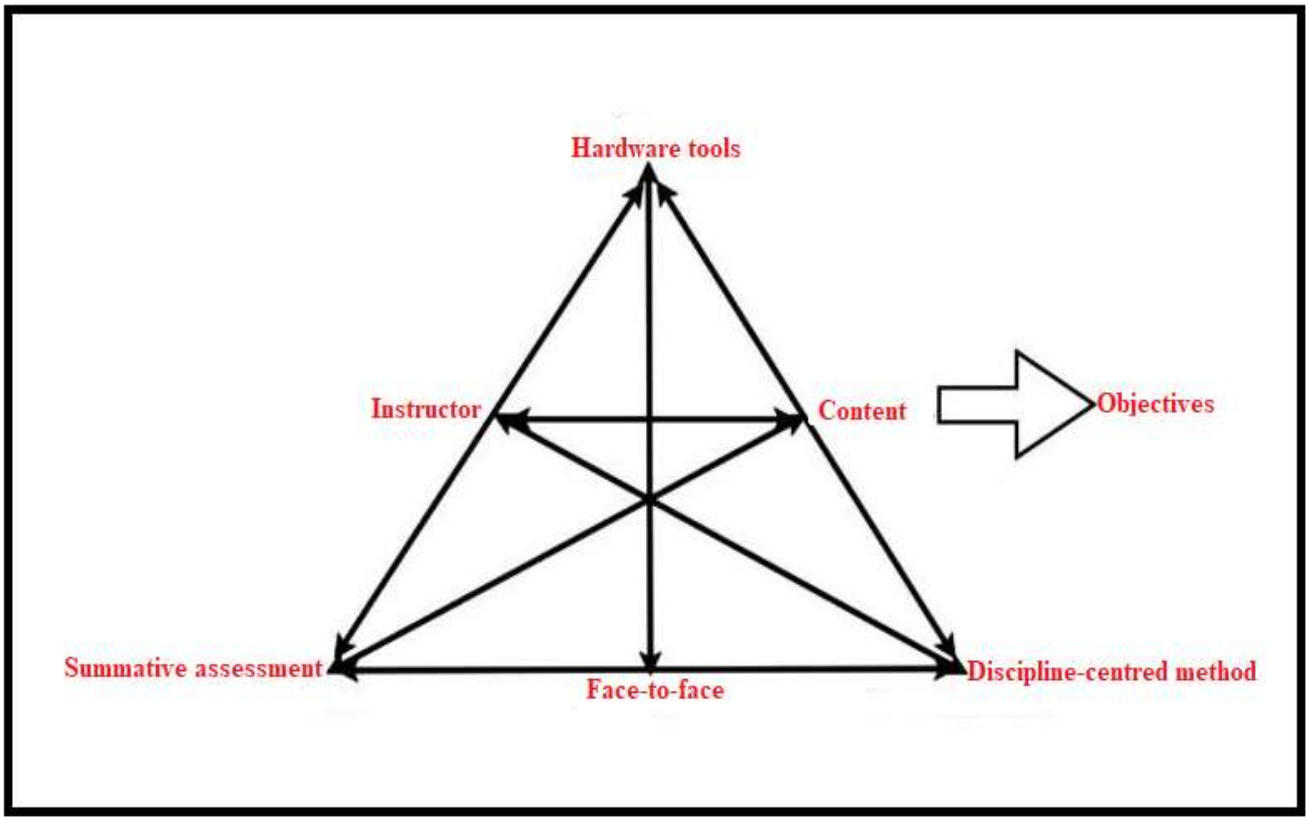

Figure 7.1: **CHAT in South African AGRIS CAPS curriculum**

The above terminology replaced the original in the Engestrom Activity Model diagram, namely, learning outcomes, subject, content, rules, community, and tools. The replacement emerged from principles obtained during data generation. The new terminology indicates how teachers apply perspectives in the teaching of AGRIS. Teachers apply a prescriptive perspective, drilling learners in mastering content knowledge. Teachers use objectives, content, hardware tools, instructor actions, a discipline-centred method, a summative assessment, and a face-to-face milieu (Khoza & Biyela, 2020; Makumane & Khoza, 2020; Mpungose, 2020a). Teachers teach AGRIS to address the subject needs. For this reason, teachers are obliged to consider all performance-based curriculum principles to improve the quality of the results, enabling learners to achieve excellent grades.

However, prescriptive perspective principles should assist teachers in understanding their habitual perspective (Khoza & Biyela, 2020; Makumane & Khoza, 2020), which seems impractical with the current AGRIS curriculum. Teachers use this perspective to inculcate content knowledge to learners; however, learners fail to apply knowledge gained to their natural world. Zubair, Tatlah, and Butt (2020) articulate that learners applying the performance-based curriculum, whether at school or in tertiary institutions receive good grades, but fail to fulfil the employers' needs in terms of skills. This suggests that the agricultural industry may sustain long-term vacancies. Learners may not become entrepreneurs, owing to lack of skills, thus increasing the rate of unemployment in our country. The current AGRIS curriculum implements the above principles, based on written policies, to meet the national education standards. Teachers need to play a pivotal role during the teaching process, to instruct learners and take control of the teaching process. In this regard, they have to draw on textbook activities and questions from previous national examination papers. This suggests that AGRIS teachers are unaware of the communicative approach (communal perspective) in developing skills, and the pragmatic approach (habitual perspective) for developing values/attitudes. Therefore, the prescriptive perspective principles are incorporated during the teaching of AGRIS.

A prescriptive perspective drives the teaching of the current AGRIS curriculum to address knowledge. However, it is written in the South African AGRIS CAPS document that teaching should be based on knowledge, skills, and attitudes/values. This document is,

however, silent on how teachers can enact communal (skills) and habitual (attitudes), while being outspoken about the prescriptive perspective (knowledge). The implementation process of this perspective appears lacking. This was evident from data generated: teachers had concerns about the complexity and lack of methodology when unpacking content. As a result, they depended on physical sciences and life sciences teachers to ease their burden on specific topics (chemistry and genetics). Nonetheless, the literature suggests that content teaching requires qualified (prescriptive) knowledge gained through professional development; learner/social knowledge (communal) obtained from the sociocultural environment, and teacher knowledge (habitual) emerging from experiences (Garner et al., 2015b; Nixon et al., 2016; Wishart, 2016). The teaching of content knowledge draws from objectives.

Confusion was detected regarding the use of goals. For instance, some teachers mentioned the use of aims, objectives, and outcomes to push the boundaries of the prescriptive perspective, which indicates the vulnerability of the South African AGRIS curriculum. However, those who highlighted the use of objectives emphasised that they employ objectives to cover the syllabus and that particular day's content. This is in line with Mpungose (2020a) articulation that a performance-based curriculum driven by a prescriptive perspective encourages teachers to adhere to objectives, thus addressing the subject's needs. For this reason, teachers use objectives to cover what is prepared for them without considering other propositions neglected by the curriculum. Teachers are mostly fulfilling the curriculum developers' intentions while neglecting outcomes (skills) and aims (values) that can improve AGRIS practice. Thus, teachers' failure to balance goal and propositions stem from the CAPS and the ATP documents, which are silent on goals. As a result, teaching is dominated by the use of hardware tools.

HW tools are teaching resources that we can touch and utilise to inculcate knowledge into learners (Khoza, 2015c, 2017b, 2018; Mabuza, 2018; Mpungose-, 2018). During data production, it was apparent that teachers relied on the CAPS and the ATP documents, textbooks, previous examination papers, and the chalkboard. These items are both tangible and instructional. Teachers followed a set order to convey educational facts and to maintain the quality standards of the performance-based curriculum (Khoza, 2017b, 2017c; Kisaka-

Jwan, 2019; Lawrence & Tar, 2018). Teachers should therefore teach vertical knowledge using explicit concepts and explicit grammar within the planned curriculum. Hyndman and Pill (2016), Rotidi et al. (2017), Khoza and Biyela (2020), Makumane and Khoza (2020), and Mpungose (2020a) share a similar view that HW tools prioritise tests and examinations, ensuring that both teachers and learners meet specific achievement standards. Indeed, HW tools lead to instructor actions during the teaching process.

It was observed from the outset (diagnostic phase) that AGRIS teachers act as instructors during their teaching process.

Popi: *"…..I use the instructional method, where I instruct and learners……"*

Ralph: *"I present the lesson to learners and use TAMC method (Teaching, Assessment, Marking and Corrections)….."*

Hloni: *"I usually explain the content to learners while writing chalkboard summary for them to copy*."

Saneh: *"I use to introduce the topic to learners, instruct them on what to do, write notes on the board and expect them to copy them."*

Tumelo: *"I use to explain the topic in detail and guide the learners to do the work. I provide direction on what learners are expected to do."*

Njinji: *"……. lecturing method works for me because it assists me to reach all learners. During the class period, I use the instructional method."*

These accounts suggest that AGRIS teachers take complete control of the lesson, implementing the curriculum precisely as developers envisioned. Teachers have to be qualified and possess in-depth knowledge of the subject. However, Makumane (2018) highlights that knowing appropriate content is inadequate. Teachers should be able to select and implement appropriate prescriptive teaching strategies to execute instructor actions. Instructors tend to be guided by policy documents, which influence them to employ the lecture method during the teaching process. Thus, the prescriptive perspective drives instructors, since stipulated and planned content guides their actions in teaching. As a result, instructors' actions drive teachers to employ discipline-centred methods in their teaching practice.

The diagnostic phase brought an in-depth understanding of teaching methods utilised by AGRIS teachers during their implementation process. For instance, teachers revealed that the lecture method is preferred and is the dominant method of their practice. Because it allows them to finish the stipulated content in time, unlike when using other, time-consuming methods, teachers use other methods during extra lessons. Thus, AGRIS teachers use the lecture method to transmit prescribed knowledge. This is in line with Cakmak and Akkutay (2016), Buchs et al. (2017), and Soomere et al. (2018) articulations that planned knowledge is effectively disseminated through lecture, rote, and drilling methods, otherwise known as discipline-centred methods. This suggests that discipline-centred methods are rooted in the cognitivism teaching theory drawing from the prescriptive perspective and employed to inculcate intended knowledge (Khoza, 2019b; Mpungose-, 2018). In addition, Buchs et al. (2017) outline that this method places more emphasis on qualification, stipulated content, tests, and examinations. Thus, AGRIS teachers formulate activities using textbooks and previous question papers.

The findings showed that AGRIS teachers are unaware that activities are categorised into content-centred, teacher-centred, and learner-centred. Participants knew that the teacher-centred activities involved the use of textbooks and previous question papers.

Popi: *"I usually use learner-centred activities, and develop activities from previous question papers and their textbooks……*".

Hloni: *"I normally use teacher-centred and learner-centred activities. ……. all the activities are from the previous question papers."*

Saneh: *"I always take all the activities from previous question papers."*

None of the teachers mentioned content-centred activities during the diagnostic phase. In addition, teachers believe that textbooks and previous question papers embrace teacher-centred and learner-centred activities. This indicates that AGRIS teachers lack knowledge of the nature of their curriculum. Teachers are struggling to understand that teacher-centred and learner-centred activities may fail to address the needs of their subject, drawing only from the performance-based curriculum. On the other hand, teachers are aware that textbook activities and activities that emerged from previous question papers yield fruitful results for their practice. However, during the transformative stage, teachers understood that content-

centred activities drive them: teachers place textbooks and previous question papers activities at the centre of their teaching. As such, teachers displayed better discernment that they employ content-centred activities in order to assist their learners to excel in their summative assessment.

AGRIS teachers were quite aware of the summative (formal) assessment, as they mentioned tests and examinations to grade learners. Homework and classwork are given to learners after the teaching and has been taken from the textbooks and previous question papers. The focus is on preparing learners for exams. However, it was observed that teachers are struggling with the informal (formative) and peer assessments.

Popi: *"I always consider informal assessment in the form of homework, classwork and class tests…. Sometimes I allow learners to mark their homework or classwork, and this is peer assessment."*

Tumelo: *"Every day I give them homework or classwork using questions from their textbooks or previous question papers*."

At the same time, formative assessment involves the teachers and learners' experiences. This disregards mark allocation for learners' performance (Box et al., 2015; Mokhtar & Adnan, 2017). The habitual perspective therefore drives this type of assessment, placing the teacher and learner experiences at the centre of assessment. Peer assessment should address social needs; thus, it allows learners to assess one another's work using a presented rubric (Kisaka-Jwan, 2019; Maba & Mantra, 2017; Mabuza, 2018; Mpungose-, 2018). Therefore, AGRIS teachers employ the formative and peer assessment futilely. The use of summative assessment compels teachers to employ a face-to-face milieu.

It was evident from data generation that AGRIS teachers normally teach in their classrooms. According to Mpungose (2020c), teachers employ a face-to-face milieu to issue summative assessment tasks to learners, executing those tasks utilising HW tools. Teachers must ensure that learners complete their tasks within the stipulated time, thus covering the planned curriculum. Teachers therefore employ face-to-face observation and monitoring of learners during the execution of tasks that require them to produce knowledge obtained per the teaching process.

7.3 Third Research Question

Why do teachers have particular perspectives of teaching agricultural sciences in secondary schools?

It was noted that AGRIS teachers teach in a manner that pushes the boundaries of the performance-based curriculum. Teachers are teaching according to planned content knowledge; teachers place more emphasis on examinations and provision of tests to grade learners' performance. The performance-based curriculum is influenced by a prescriptive perspective, which is driven by principles such as objectives, content knowledge, hardware tools, instructor actions, a discipline-centred method, content-centred activities, summative assessment, and a face-to-face milieu. In this instance, the study's findings indicate that the 'why' question addressed professional underpinnings rather than philosophical underpinnings. Teachers teach in a manner dominated by knowledge implementation. For instance, the performance-based curriculum concentrates on the content teachers should implement during the teaching process, characterised by the chronological execution of the vast content knowledge to be covered within a stipulated time.

The discourse of the performance curriculum is emphasised by the studies conducted by scholars such as Schubert (1996), Bernstein (1999), Beinstein (2000), Hoadley and Muller (2009), Hoadley and Jansen (2012), and others who affirm that the performance-based curriculum advocates for knowledge obtained from school. Studies concur that school knowledge is dominated by sequential vertical knowledge characterised by explicit concepts and grammar pertinent for each subject. This curriculum therefore addresses the subject's needs since it focuses on knowledge to be cascaded as planned following the systematic, sequenced, and hierarchal content. Thus, a prescriptive perspective drives the performance-based curriculum, influenced by the set policies such as the AGRIS CAPS document and the ATP that stipulate the content to be taught.

7.4 The SA AGRIS Curriculum Gaps

The gaps in the AGRIS curriculum arise from various stages of curriculum design and development. There seems no connection between colleges/universities offering agricultural education, the Department of Education, school governing bodies (SGBs), and industries.

Therefore, AGRIS teachers provide a curriculum that does not teach learners for life; a curriculum that also fails to prepare learners for employment. This indicates a lack of collaboration with relevant stakeholders to ameliorate the plight of affected stakeholders. This is attested to by the study conducted by Biswas, Ghadei, and Biswas (2020) alerting researchers and others to various reforms in agricultural education on the subject matter. The results indicate that curriculum developers should develop the AGRIS curriculum in collaboration with the agricultural industry and government educational agencies. There appears to be a curriculum gap in the agricultural curriculum development and balancing of the AGRIS practice in schools. Nonetheless, AGRIS seems to lack appropriate sources of information about the workforce or real-life job demands in the framework of globalisation. I firmly believe that this study may assist in bringing about a balanced curriculum, to address the needs of the current curriculum and meet industry needs while enhancing self-employment.

A study was conducted by Greyling (2015), based on the contribution of agriculture to the South African economy. This study concluded that South Africa is producing an abundance of lawyers rather than future farmers. This may lead to food insecurity and higher food prices. On the other hand, the findings of this study may bring improvement to AGRIS practice and have implications for curriculum users and decision-makers in the education sector. A curriculum review could be driven by learners' production capacitated with knowledge, skills, and attitude, qualifying learners to be progressive farmers. However, this study has nothing to do with colleges and universities. Its focus is on teaching AGRIS in schools. The theory proposed by this study (the PCHP theory) may bridge the gap between policies available in the performance-based curriculum and practices in schools offering AGRIS. The dynamics of the gaps displayed by the South African CAPS curriculum are depicted in Figure 7.2 below.

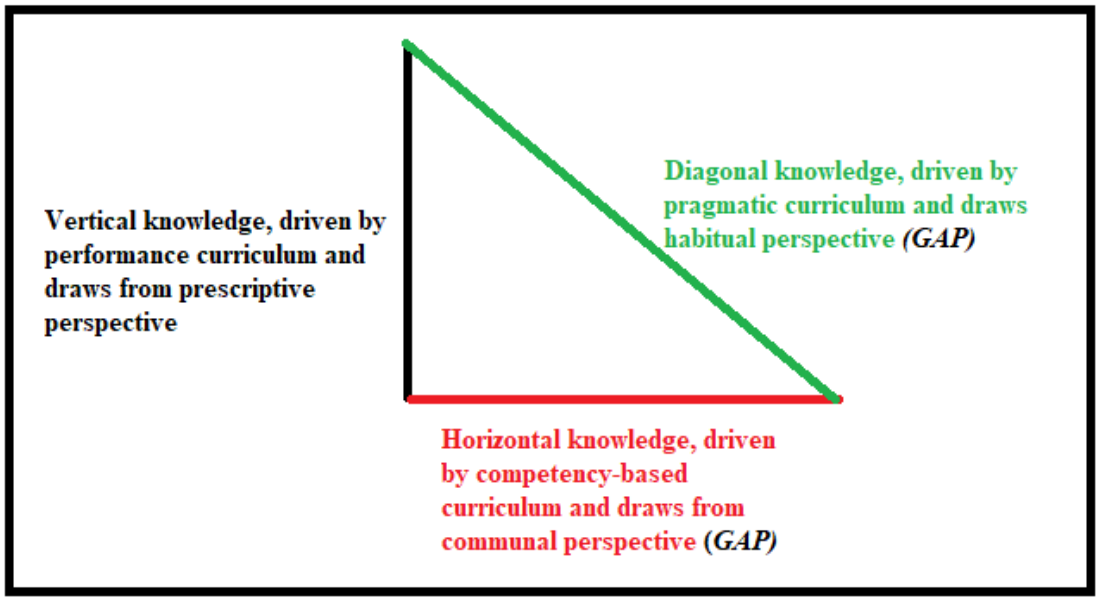

Figure 7.2: Gaps in the SA AGRIS CAPS curriculum amended from (Khoza, 2019)

The above Figure 7.2 signifies that the SA AGRIS curriculum is rooted in a performance-based curriculum in which vertical knowledge dominates, under the influence of a prescriptive perspective. By contrast, the competency-based (horizontal knowledge) and pragmatic-based curriculum (diagonal knowledge) are neglected. The current AGRIS curriculum in South Africa produces learners with knowledge (prescriptive perspective) that may never be utilised in the workforce because it omits attitudes (habitual perspective) and skills (communal perspective). As such, scholars like Thijs and Van den Akker (2009), Berkvens et al. (2014), Fomunyan (2014b), Khoza (2019b), Khoza and Biyela (2020), Makumane and Khoza (2020), Mpungose (2020b), Mpungose and Khoza (2020) are of the same viewpoint. These authors claim that a balanced curriculum should embed the prescriptive (performance-based curriculum), communal (competency-based curriculum), and habitual (pragmatic-based curriculum) perspectives. Thus, their accounts certify that South African AGRIS, as a subject, seems unbalanced, embracing a specific curriculum known as the performance-based curriculum. Thus, the competency-based and pragmatic-based curriculum are critical gaps in the South African AGRIS curriculum.

The competency-based curriculum "*is a form of curriculum that derives a curriculum from an analysis of prospective or actual role in modern society and that attempts to certify student progress based on demonstrated performance in some or all aspects of that role"*

(Banerjee, Tuffnell, & Alkhadragy, 2019, p. 2; Sutcliffe, Chan, & Nakayama, 2020). In addition, Mulenga and Kabombwe (2019) claim that a competency-based curriculum connects education to realistic experiences. Such a curriculum assists learners to obtain skills to retrieve, assess, examine, and practically apply such to real-life situations. This type of curriculum would provide learners with practical experiences, which might assist them in obtaining long-term life skills, thus enabling them to earn a living.

Further to the above, a competency-based curriculum places society's needs at the centre of teaching; it is not content-centred and time-based. Thus, the teaching activities and assessment techniques focus more on skills development than inculcation of knowledge (Desai, Jorwekar, Badyal, & Singh, 2016; Khilnani, Thaddanee, Khilnani, & Rao, 2020). This type of curriculum emphasises skills and competencies that serve society's expectations and are influenced by a communal perspective (Khoza, 2016a). This suggests that the AGRIS curriculum should involve the developing of skills in soil analysis, plant production, animal nutrition, animal production, animal reproduction, animal protection and control. However, this calls for the reduction of prescribed content so that teachers may foster learning outcomes by imparting hands-on skills. Zubair et al. (2020) stress the significance of skills development, affirming that the skills are of paramount importance to economic growth: such skills manifest in a competent learner who effectively contributes to the development and progress of the citizenry.

The competency-based curriculum assessment would not be summative because each learner would be assessed per measurable and observable outcomes. According to Khilnani et al. (2020), this curriculum is learner-centric since its focus is on individual competencies or outcomes. The competency-based curriculum requires teachers to assist learners to attain extensive outcomes that would make them more recognised in society, regardless of their intellectual differences. For this reason, the teaching and assessment influenced by this curriculum would focus on real-life social practices. This curriculum's focus is on producing learners capable of contributing to community development. Interestingly, the competency-based curriculum demands a constructive approach to teaching. This curriculum accentuates the fundamental role of social communication and discussion on topics and aspects to enhance socially constructed knowledge and innovative strategies to mitigate the

unemployment rate (Roberts, Stair, & Granberry, 2020). Thus, this curriculum can be used in various educational situations other than the classroom, such as online settings and social media groups, to share opinions.

Sharing of opinions is driven by indigenous knowledge (horizontal knowledge) (Bernstein, 1999). This is known as the local knowledge obtained from conversations and other peoples' opinions, rooted in everyday knowledge (Bernstein, 1999; Hoadley and Jansen, 2013; Khoza, 2015c). The horizontal discourse has to do with indigenous knowledge as it is not scientific nor written down. This knowledge is not influenced by teachers' qualifications nor content reasoning; however, it is grounded in societal norms, culture, history, and local context. Furthermore, horizontal knowledge stimulates confidence and boosts learners' egos; learners learn to exercise full control over the way they learn and when they learn. A communal perspective therefore drives the competency-based curriculum.

A competency-based curriculum is therefore of significance to AGRIS. This most apposite curriculum capacitates learners with skills needed in the agriculture industry. It emphasises local or indigenous knowledge, which might encourage learners to become entrepreneurs or future farmers. The South African AGRIS curriculum focuses on scientific knowledge, which neglects indigenous knowledge that might stimulate adequate understanding of scientific knowledge. At the same time, the curriculum permits learners to apply knowledge gained from the performance-based curriculum to their real-life settings. For instance, a competency-based curriculum calls for the inclusion of practical assessment tasks (PATs), which would impart hands-on skills to learners while allowing teachers to assess desired outcomes. Learners can only acquire essential skills in any field of AGRIS through PATs, which might be conducted in far-flung areas because many schools have no practical sites. Thus, PATs may bring immense improvement to the subject, and contribute to a high employment rate in our communities.

The primary purpose of PATs in AGRIS is to educate both established and prospective farmers on proficiency in farming (Samon, 2017). PATs provide learners with experience, exposing them to the practical reality of learning, at the same time equipping them with

required practical skills in agricultural practices to effectively involve themselves in the agricultural enterprise (Ouma, Toromo, Wanami, Kabesa, & Mubichakani, 2020). A study was conducted to assess whether teaching AGRIS without the involvement of PATs provides learners with skills required in crop production for food security. The results reflected that teaching AGRIS without PATs does not capacitate learners with skills in agricultural production in society. However, Hulela (2017) claims that PATs is beneficial in AGRIS teaching because it assists learners to evolve psychomotor skills, and balanced learning; it assists learners in making informed decisions about their jobs, and it develops their entrepreneurial skills. Furthermore, PATs are imperative for the teaching of AGRIS because it permits learners to become self-reliant; PATs enable learners independently to solve particular fundamental challenges in agriculture (Samon, 2017). This, in turn, suggests that the infusion of PATs may improve AGRIS practice to a greater extent.

Moreover, AGRIS teachers in schools can assist learners to acquire skills and knowledge to improve their living. This curriculum may prepare learners to be independent, vigilant, and specifically fortified with entrepreneurial skills that assure them self-employment. Nonetheless, the failure of the South African AGRIS curriculum to serve society's expectations may jeopardise food security for this country. A competency-based curriculum may be the key to producing learners able to apply critical-thinking and problem-solving tactics in addressing current social issues such as land use in South Africa. A communal perspective thus drives a competency-based curriculum to ensure that society's needs are addressed. In addition, this curriculum capacitates learners with adequate skills to become self-reliant community developers. However, the South African AGRIS curriculum also omits the habitual perspective (pragmatic-based curriculum), which motivates teachers and learners to adopt the prescriptive (performance-based curriculum) and the communal perspective (competency-based curriculum) (Mpungose & Khoza, 2020). A pragmatic-based curriculum (habitual perspective) plays a significant role in marrying the performance-(prescriptive) and competency-based (communal) curricula (Khoza, 2019a).

A pragmatic-based curriculum is driven by an habitual perspective in which life experiences of the teacher are placed at the centre of teaching (Makumane & Khoza, 2020; Mpungose, 2020a, 2020b; Mpungose & Khoza, 2020). The focus of this curriculum is to develop

personal values/attitudes/interests rather than increasing facts and skills. Stoller (2018) affirms that the main aim of this curriculum is to provide profound, personalised acquaintanceship with our context, the development of critical agency, and generating the emotional need to construct significant change. Through a pragmatic-based curriculum, teachers assist learners in connecting new knowledge to their realistic knowledge, motivating learners' continual involvement, and making sure that learners are capable of transferring their new knowledge to successive environments (Hickey, Chartrand, & Andrews, 2020). A pragmatic-based curriculum emphasises the utilisation of experiences to deal with new events in personal and social life.

A pragmatic-based curriculum has to do with generating desire, and motivating genuine learner interest through an habitual perspective. For instance, in AGRIS, teachers can effectively teach learners what they must know about rearing animals from the prescriptive perspective; and about rearing animals from the communal perspective. However, if learners fail to understand why the rearing of animals is of paramount importance, their teaching will be futile. In other words, knowledge and skills on rearing animals are inadequate without the value of rearing animals. According to Gary (2019), a pragmatic-based curriculum is not about standards, which are always systematic, but is about a saturated phenomenon. This suggests that a pragmatic curriculum is driven by an habitual perspective. This is what drew teachers into teaching AGRIS, which contributes to both teachers' and learners' love of the subject. Fundamentally, a pragmatic-based curriculum does not necessarily require teachers to be fixated on the textbooks − it requires creative and innovative teachers (Firmanto, Rahmawati, Degeng, & Chusniyan, 2019). In this regard, a pragmatic-based curriculum requires teacher knowledge.

Teacher knowledge is defined by Verloop et al. (2001) and van Driel et al. (2001) as personal knowledge determined by individual experiences, personal history, and context, and is associated with how the teacher behaves in the classroom. According to Zembylas (2007), teacher knowledge has to do with the teacher's own experiences regarding the subject and the learners; and the broader social and political setting wherein teaching and learning occur. In other words, teachers should teach prescribed content and indigenous knowledge guided by a particular theoretical stance. As such, teacher experiences should always be at the centre

of teaching, and the assessment should be based on aims. Scholars like Kennedy et al. (2006), Fink (2013), 'Mpungose (2016b), Ngubane-Mokiwa and Khoza (2016), and Ndlovu (2017) agree that aims are statements of the teachers' intents that provide direction on how teaching should be occurring. Aims have emerged from teachers' experiences, and are imbued with implicit knowledge. This suggests that teacher knowledge is teacher-centric, teachers being responsible for shaping and changing learners' attitudes/interests apropos of AGRIS. Such would be fundamental to their everyday lives.

According to Burrows, Sorensen, and Spielmaker (2020), to teach according to learners' interests and needs, the teacher should deviate from teaching content and enact interest and feelings adopted on the significant role of AGRIS. Teachers' rationale for teaching AGRIS is personal and driven by an habitual perspective. Interests/attitudes are viewed by Ige et al. (2016b), and Ouma et al. (2020) as the most critical aspects of teaching AGRIS, bringing intense motivation to learners to conduct agricultural practices. Nonetheless, the study by Antwini (2017) on how teachers can improve learners' attitudes towards AGRIS indicates that good interests have evolved through AGRIS clubs, awards, and scholarships for achievers. In addition, Antwini emphasises that AGRIS should have specific periods allocated for practical lessons within the school timetable. This suggests that developing learners' attitudes/interests relies on time allocated for practical lessons. This calls for the reduction of AGRIS content because all the periods are allocated for teaching and completing the stipulated content in South Africa.

7.5 Conclusion of the Chapter

The above discussion suggests that the South African AGRIS teachers are not exposing learners to principles pivotal to the agricultural production in the country. This is attributed to the performance-based curriculum, which fails to assist learners in developing skills and abilities required in agricultural production. Furthermore, this curriculum fails to develop learners' interests and awareness of opportunities in the agricultural industry. At the same time, it fails to create learners' understanding of agriculture and its paramount importance to households nationwide. As a result, teachers fail to produce self-reliant, resourceful learners with problem-solving abilities, and learners who understand that farming is a profitable and dignified occupation.

Moreover, the South African AGRIS curriculum should enable learners to develop greater interest in AGRIS, while viewing agriculture as a viable occupation that can lead to personal and social development. Thus, the curriculum should intertwine knowledge (prescriptive), skills (communal), and interests/attitudes (habitual) perspectives. The balanced curriculum should embrace three forms of curriculum (performance-, competency-, and pragmatic-based). The next chapter discusses the PCHP theory, which may bridge the gap within the South African AGRIS current curriculum (CAPS) and assist AGRIS teachers in addressing the subject needs, society/learner needs, and personal/teacher needs.

CHAPTER EIGHT

THE PHILOSOPHICAL STANCE AND THE PCHP THEORY FOR TEACHING AGRIS IN SCHOOLS

8.1 Introduction

In this chapter, I contend for quality in the teaching of AGRIS in secondary schools. I base my focus on teachers' perspectives, which emanated from literature and is posited by eminent scholars. Scholars propose that the AGRIS school curriculum include a prescriptive perspective (subject needs), a communal perspective (society/learner needs), and an habitual perspective (personal/teacher needs). Consequently, teachers' perspectives yielded a PCHP theory that is meant to assist teachers to teach what they know (content), why they understand it (values/attitudes), and how they understand it (social context). The PCHP theory may bring transformation and improvement to AGRIS practice while enabling teachers to produce competent citizens with competent knowledge, skills, and attitudes required by the workforce. Subsequently, the chapter outlines the PCHP theory model for teaching AGRIS, discussing all the principles of the PCHP theory. The conclusion of the chapter follows.

8.2 Prescriptive Perspective

The prescriptive perspective is often the first to be discussed, simply because the South African AGRIS curriculum is rooted in this perspective. The AGRIS curricular delivery is based on rote learning, memorisation of facts, and reproduction during examinations of the knowledge. Teachers utilise a hundred per cent of their time on classroom teaching and library assignments. Curriculum delivery is clearly one-sided, based on the inculcation of scientific knowledge into learners. In my view, teachers driven by a prescriptive perspective lack practical dynamics of the subject. These teachers produce learners with limited opportunities of contacting the farming society, to understand and develop their communities. Thus, this perspective leads to producing learners with no practical skills related to initiating and operating an agricultural business. In addition, learners demanded by the industry as well as the society are not produced. This fact is noted in the literature, the prescriptive perspective merely cascading knowledge following specific guidelines and textbooks during the teaching process. My most significant concern is that a prescriptive

perspective results in teaching practice that does not integrate subject needs with existing learners' needs and reality. In this regard, individual use of this perspective in AGRIS cannot accomplish the necessary socio-economic transformation among communities for successful sustainable development with concomitant decrease in poverty.

A prescriptive perspective drives the AGRIS curriculum: this curriculum has been developed without any structured needs analysis for South Africa. The prescriptive perspective is unresponsive to socio-economic, physical, and environmental changes in the agricultural industry; it is inappropriate for our country's existing condition, as it is employed individually. At this stage, teachers driven by this perspective have an adequate theory of agricultural sciences but lack the practical knowledge in agriculture. This is not their fault; the performance-based curriculum is prescriptive and demands adherence to stipulated rules and regulations. We cannot escape from this perspective because AGRIS in South Africa is steered by a national education structure planned and controlled, and based on our nine provinces. Provincial legislation cannot efficiently control educational matters − the national Department of Basic Education (DBE) is responsible for such. For this reason, AGRIS educational matters need to be organised according to norms and standards at the national level. The practice of AGRIS is based on policies compiled by the national Department of Education accepting that a prescriptive perspective will dominate.

The national Department of Education complied with teaching AGRIS to ensure that teachers are influenced by a prescriptive perspective when delivering the written, taught, and tested curriculum as required. Teachers in this domain play the role of curriculum implementers with no rights to select and decide what to teach from the prescribed AGRIS curriculum. This perspective emphasises what to teach rather than how to teach, which poses challenges to teachers teaching AGRIS. This was evident in the data generated, and teachers were teaching according to their discretion. However, the literature claims that effective teaching occurs when AGRIS teachers know which method to employ in a particular situation to meet specific goals.

The above information suggests that the reliance on a prescriptive perspective for teaching of South African AGRIS results in a curriculum that fails to address the needs of the agriculture industry, which demands skills-knowledge practice. In today's world of work, the evolution of skills is required to balance the prescribed content knowledge. Entrepreneurs are expected to play a paramount role in the development of the South African economy; a set of skills must be positioned as essential supplements to AGRIS content knowledge. This suggests that the AGRIS curriculum must include other perspectives (communal and habitual) to meet the requirement of our agricultural industry and societies.

8.3 Communal Perspective

A communal perspective may therefore assist AGRIS teachers to capacitate learners with skills pertinent to balancing knowledge and practice. Moreover, I believe that the world of work and the community at large demands skills-knowledge-practice components to inflate the country's economy. Traditionally, life was dominated by indigenous knowledge rather than scientific knowledge. People had the skills to farm crops and livestock using herbs and indigenous knowledge to solve problems found in humans, plants, and livestock. No medical doctors and veterinarians saw to humans and livestock, hence farmers had money, and independence; they were not engulfed by poverty and hunger. Indigenous knowledge (communal perspective) in AGRIS practice should be respected and adhered to. This suggests a significant consideration of the inclusion of communal perspective in the South African AGRIS curriculum.

In this country, the population and unemployment rate have increased thus, poverty and hunger follows. The AGRIS curriculum may be the only solution, if restructuring occur and curriculum developers consider the infusion of practical skills. The AGRIS content utilised for teaching has been accepted/implemented without sufficient contextualisation and modification to best suit local environments. For instance, the South African AGRIS curriculum was designed without consulting and establishing farming communities that teachers may interact with to enrich their teaching process. The AGRIS curriculum in South Africa is overly theoretical − PATs is not considered. AGRIS is pivotal for economic evolvement, food security, poverty alleviation as well as social development. Thus, its emphasis should be more on improving skills and less on improving knowledge. Thus, the

communal perspective is pivotal to developing skills in our country for sustainable development and food security.

In South Africa, AGRIS learners who have completed their secondary school education lack the required practical skills to venture into basic agricultural practices, making it difficult for them to successfully involve themselves in agricultural enterprises. However, AGRIS as a subject can provide learners with an advantage in obtaining practical skills leading to self-reliance and agripreneurship after completing secondary school education. At the same time, such entrepreneurs can contribute profoundly to food security issues in our country. For this to emerge in schools, practical agricultural knowledge must be entrenched in the South African AGRIS curriculum. It is therefore imperative to infuse the communal perspective into the CAPS curriculum in South Africa to accommodate intensive and practical experiences that supply robust support to agricultural concepts taught within the classrooms. This aligns with what is said by Yusuf, Popoola, and Olutegbe (2019), that knowledge obtained by a learner without adequate structure to bind it together, is knowledge that a learner can forget with ease.

Moreover, AGRIS teachers should take a communal perspective, this playing a vital role in developing practical skills for learners. However, practical skills should be allocated adequate time to bring success to both teachers and learners. Curriculum developers should therefore undertake a thorough review of the AGRIS curriculum in schools, especially in reducing prescribed content. However, AGRIS teachers should understand that teaching this subject goes beyond acquiring scientific knowledge; it extends to capacitating learners with the required skills to be globally competent. As long as the prescriptive perspective drives the teaching of AGRIS, the South African AGRIS curriculum may remain vulnerable and weak, too much emphasis being laid on theory rather than on the practical aspects of the subject.

By contrast, practical aspects enable learners to transfer knowledge gained from theory to real-world situations. As such, the integration of communal perspective can make the AGRIS curriculum more efficient, while improving the skills of agriculture learners in South

Africa. My greatest concern regarding the AGRIS curriculum in South Africa is that some 43 secondary agricultural schools in this country in various provinces offer agricultural sciences, agricultural management practices, and agricultural technology (Madakadze, Masamvu, Terreblanche, & Minde, 2014). This indicates that there are certain schools in South Africa wherein the AGRIS curriculum is driven by prescriptive (agricultural sciences), communal (agricultural management practices), and habitual (agricultural technology) perspectives. Schools that offer combined components of AGRIS, produce learners who can become agripreneurs (an entrepreneur who owns an agriculture-related business) without embarking on tertiary education. Such schools have the necessary resources and infrastructure for teaching agricultural management and technology, thus addressing social and economic justice issues.

8.4 Habitual Perspective

I believe that teaching without developing interest results in futility. For instance, teaching learners how to grow a tree is inadequate without teaching the value of a tree. Incomplete teaching would fail to develop learners' interest in growing trees. This is attested to by Olutosin, Otekunrin, and Lean (2019) who articulate that interest/attitude is considered one of the fundamental factors of a person's intent to perform a specific performance and behaviour. The habitual perspective is therefore a critical factor in AGRIS teaching. Note that during the apartheid regime, agriculture was perceived as a punishment subject. Even nowadays, learners perceive agriculture as a non-valuable subject for people who wear gumboots and overalls. See the study conducted by Dlamini* (2017) on factors influencing the choice of agriculture as a subject. On all the factors that this researcher was exploring, it was revealed that learners have a negative attitude towards AGRIS. However, Oguttu, Heeralal, Ngoepe, and Kaino (2014) argue that a negative attitude towards AGRIS is caused by teachers who offered advice to learners having to choose AGRIS without considering their interest in the subject. Nonetheless, teachers driven by an habitual perspective can remedy the situation by developing an interest in the subject.

An habitual perspective may assist AGRIS teachers in rousing and sustaining learners' interest in agriculture, which may enable learners to advance in farming, and food production, preparing them for producing and marketing farm products efficiently and cost-

effectively. For instilling interest into AGRIS, the school farm sites for crop and livestock farms and AGRIS laboratories are of crucial importance. The Department of Education should liaise with nearby farmers who may allow teachers to provide learners with practical experience in food production and natural resource management. This further calls for the curriculum developers to provide opportunities within the AGRIS curriculum ATP, allowing teachers to develop learners' interests using their experiences and practical experiences. See Yusuf et al.'s (2019) study on students' perceptions of practical agricultural experience supports this view though it was based on Fort Hare University. The study showed that taking learners to farm sites for many weeks develops enormous interest in the subject. Thus, there is a need for studies that can explore the correlation between interests and teacher/learner performance. I believe that learners' interests in agriculture influence their beliefs, intents, and academic performance. As such, interest affects learners' attitudes towards AGRIS and to their pursuing careers in agriculture. An interest in AGRIS allows for better discernment of scientific concepts.

The above highlights my philosophical stance on the South African AGRIS curriculum, which sparked my interest in developing the PCHP theory. The PCHP theory may improve the quality of the AGRIS curriculum while bringing a balance between the performance-, competency-, and pragmatic-based curriculums. The South African AGRIS CAPS document stipulates that the teaching of AGRIS is based on capacitating learners with knowledge, skills, and values. However, the CAPS document is silent about why and how teachers should assist learners to attain such. The PCHP theory constitutes what (knowledge), how (skills), and why (attitudes/interests) teachers should implement and enact in order to adequately inculcate all three aspects of teaching (knowledge, skills, and attitudes) to learners.

The PCHP theory emphasises that, for quality teaching of AGRIS in South Africa, the curriculum should intertwine the prescriptive, communal, and habitual perspectives. In essence, the AGRIS curriculum should embrace the dynamics of the performance (knowledge), competency-based (skills), and pragmatic (attitudes/interests) curriculums. It is observed that the AGRIS curriculum is rooted in the performance-based curriculum (knowledge) and thus driven by a prescriptive perspective. However, this curriculum

neglects other curriculum aspects, which could ascertain skills and attitudes. Thus, the PCHP theory exhibits the perspectives (prescriptive, communal, and habitual) that AGRIS teachers should adhere to to transform themselves and improve their practice.

Each perspective upholds seven principles that teachers can implement and enact to transform and improve the South African AGRIS curriculum. The AGRIS curriculum should consist of roots, stems, and branches like a tree. It should prioritise the inculcation of values/attitudes/interests by embracing the *habitual perspective*, which is driven by several principles, namely: *teacher knowledge; aims; ideological-ware tools; researcher actions; teacher-centred method; formative assessment; and blended milieu*. It should involve skills development by infusing the *communal perspective* driven by *indigenous knowledge, learning outcomes, software tools, facilitator actions, peer assessment, and online milieu.* At the same time, it should ensure that it includes fundamental principles that are grounded by *prescriptive perspective*, such as *content knowledge, objectives, hard-ware tools; instructor actions; discipline-centred method, summative assessment, and face-to-face milieu.* Nonetheless, the PCHP theory emanated from the literature and is established to transform AGRIS teachers and improve AGRIS practice. Figure 8.1 below bestows the PCHP theory model for teaching AGRIS in secondary schools.

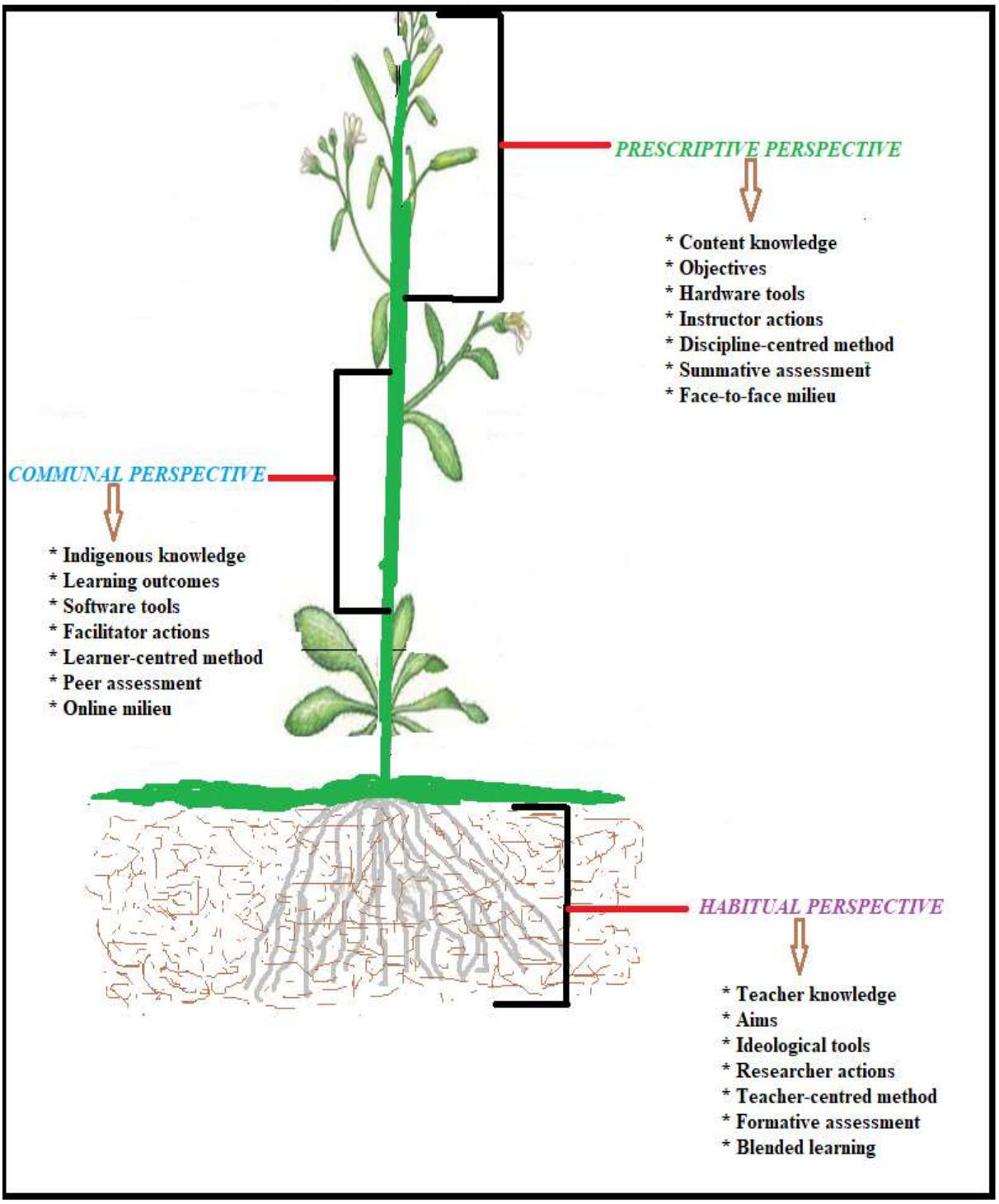

Figure 8.1: PCHP Theory for teaching AGRIS in secondary schools

The PCHP theory is illustrated by a tree, with roots, stems, and branches with flourishing flowers. According to this study, roots symbolise the *habitual perspective*; teachers' experiences are at the centre of teachers developing learners' interests. From my viewpoint, roots are responsible for anchoring the plant in place, resisting the forces of wind, running

water, and mudflow, which can make the plant wilt. Roots are essential for the successful growth of the plant, as they absorb water and nutrients from the soil, which in turn are transported to the stem, eventually leading to branches and flowers. The habitual perspective forms a concrete foundation in building a successful learner with adequate knowledge of his or her career. Through teachers' experiences, learners develop enormous interest in AGRIS, which can never be erased or manipulated by anyone. This suggests that teaching without developing learners' interests hampers proper decisions about the future. This is similar to capacitating a learner with in-depth AGRIS knowledge, who then becomes a dry clean worker at the end of school.The South African AGRIS curriculum prevents teachers from using an habitual perspective to develop affective skills. However, applying the habitual perspective without enacting principles optimal to addressing this perspective is futile. According to the literature, an *habitual perspective* is driven by teacher knowledge, aims, ideological-ware tools, researcher actions, the teacher-centred method, formative assessment, and a blended milieu to develop learners' interests.

The development of interests is grounded in teacher knowledge. Teacher knowledge is the material an individual teacher can utilise in classroom teaching (Scheiner, Montes, Godino, Carrillo, & Pino-Fan, 2019). This knowledge is specific to teaching work and is not developed through training in a subject alone, but driven by teacher experiences (Andrews, Auerbach, & Grant, 2019). Teacher knowledge is intrinsic to the self, and influenced by individual beliefs. Such knowledge develops further through reading applicable books, magazines, and literature. Schoenfeld (2019) argues that teacher knowledge assists the teacher in creating a conducive learning milieu; it allows teachers to integrate their insights, feelings, and inclinations and their discernment and complementary competencies. For this reason, teacher knowledge is driven by aims (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

Aims are teachers' long-term goals, which give them the impetus for teaching the subject. Aims can address an individual's identity, allowing teachers to discern their actions (Khoza & Biyela, 2020; Mpungose, 2020b). Mpungose (2020a) argues that aims are responsible for evolving personal development and growth, leading to self-direction. Aims draw from individual personal actions that are held in the subconscious mind (Khoza, 2016a). This

suggests that aims are a fundamental aspect of both teachers and learners, being driven by real-life experiences, cultural backgrounds, and personal identities. In other words, aims drive an habitual perspective (pragmatic-based curriculum) and allow teachers to produce new knowledge that brings balance between the prescriptive (performance-based curriculum) and the communal perspective (competency-based curriculum) (Khoza, 2021a & 2021b; Khoza & Mpungose, 2020; Mabuza & Khoza, 2021; Ngubane-Mokiwa & Khoza, 2021). Thus, since aims encourage self-direction, teachers should employ ideological-ware tools during their teaching practice (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

Ideological-ware tools should drive any curriculum and have nothing to do with technology (Khoza, 2015a). According to Khoza (2015c), IW tools ensure that teachers are teaching properly. Khoza (2015a) emphasises that teachers must understand all the IW tools that underpin their performance-based curriculum; this before selecting technological tools to implement during their teaching process. IW tools form the basis of every type of teaching. However, teachers need to understand that this type of tool is intangible and comes from within. IW tools are responsible for effective teaching. The use of IW tools leads to a teacher becoming a researcher in the subject; thus, IW tools assist a researcher during his or her practice (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

The role of a researcher is to generate new knowledge for the subject while being concerned about the structuring of teaching that is pertinent to all social beings in secondary schools (Fagundes, 2016). Thus, the researcher's actions involve incorporating theory and practice to reinforce the evolution of learners' proficiency. This aligns with Stuber and Jyrkiairen (2020) argument that theory and practice should always be at the researcher's heart. Distinctive forms of collaboration impart opportunities, cooperation, and leadership for the learner from a different upbringing. The researcher role enables teachers to teach young stars worldwide values. Teachers with a passion for the subject are good teachers and are far better than those who depend on textbooks. The teacher who integrates passion, personal knowledge, and prescribed work is the perfect teacher (Saifnazarov, Abdulllahanova, Alimatova, & Kudratova, 2020). This suggests that an AGRIS teacher, who acts as a researcher should be aware of various spheres of the subject, be alert to new research and novelties, and attempt to predict the future. In addition, teachers should remember that

teaching, development, and background are the core principles of his work. In fulfilling principles, teachers should enact teacher-centred methods during AGRIS practice (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

The teacher-centred method focuses on the teacher as a primary source of knowledge (Lau, 2020). During teaching, the teacher dominates the class to enhance effective teaching (Ajayi & Otoide, 2020) while filtering own beliefs, learners' experiences, and behaviours (Anney & Bulayi, 2020). In this regard, teachers' experiences are at the centre of teaching in developing learners' values and interests. This method allows the teacher to employ personal expertise in assisting learners to discern and integrate real-life experiences. As a result, assessment monitors learners' learning. In essence, a teacher-centred method permits teachers to discover learners' weaknesses and areas that learners have failed to discern during teaching. The teacher should adhere to formative assessment (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

Formative assessment is rooted in teachers' knowledge and beliefs about the subject (Widiastuti, Mukminatien, Prayogo, & Irawati, 2020). It is employed by teachers to understand their learners' thinking better and to improve instruction (Dini, Sevian, Caushi, & Picon, 2020; Jeong, Gonzalez-Gomez, & Prieto, 2020). Teachers usually enact formative assessment to develop learners' interests in the subject. This is attested to by the study conducted by Leenknecht et al. (2020) on the role of formative assessment on learners' interests. The results showed that formative assessment plays a pivotal role in developing learners' interests and competencies. Therefore in AGRIS, the formative assessment may assist learners in developing critical thinking to solve agricultural problems within society, while imbuing them with a strong ability for self-based learning and cooperation. Thus, to accomplish effective formative assessment, AGRIS teachers should use a blended milieu (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

The blended milieu permits teachers to collaborate on face-to-face teaching with tailored online teaching to develop learners' interests and respond to individual needs (Berga et al., 2020). It motivates learners to evolve cognitively and become socially competent while

improving their communication, problem-solving, and creative capabilities (Cheng, Hwang, & Lai, 2019; Lumanglas, 2020). As a result, teachers, using a blended milieu produce researchers, collaborators, practitioners who are self-motivated and self-disciplined (Sriwichai, 2020). A blended milieu brings balance between the prescriptive and communal perspectives, but is driven by an habitual perspective. Thus, the blended milieu is of paramount importance in maintaining and improving the quality of the AGRIS curriculum in South Africa. The discernment of an habitual perspective draws our attention further to the pivotal role of the stem as a communal perspective.

A stem signifies the *communal perspective*, wherein the society is put at the centre of teaching to develop learners' skills. Without a stem, the branches, leaves, and fruits will never flourish. The stem plays a vital role in connecting the roots to the leaves, assisting in translocating minerals and water absorbed to various parts of the plants. In addition, the main function of the stem is to support the leaves and transport water and minerals to the leaves. This is crucial because minerals and water that the stem transports manufacture vital products such as fruits and vegetables. A plant can effectively produce food to sustain life through its roots and stem. Without the communal perspective, which is responsible for capacitating learners with skills, the learner may fail to understand the content knowledge. The acquisition of adequate skills can make learners competent, marketable, and demanded by the corporate world. According to literature, a *communal perspective* is driven by indigenous knowledge, learning outcomes, software tools, facilitator actions, the learner-centred method, peer assessment, and an online milieu to develop learners' skills.

Teachers' development of learners' skills revolves around indigenous knowledge. This knowledge is compatible with learners' background, which permits learners to retain knowledge taught from early childhood within their household and society (Ogbo & Ndubisi, 2018). Indigenous people are known to possess in-depth "*knowledge of indigenous technology relating to agriculture, pest management, crop biodiversity conservation, and ethnoveterinary practices*" (Abera, 2020; Pandey, Somvanshi, Prakash, & Kumar, 2020, p. 1012). Nigussie, Betebo, and Yousuf (2020) claim that conservation agriculture (CA) is rooted in indigenous farming societies rather than scientific farming societies. Indigenous knowledge is meant to resolve problems of various societies, being grounded in real

community life and needs. CA grooms learners to fit into their society because it is taught following tangible conditions. Indigenous knowledge emphasises practical teaching wherein learners learn by observing, partaking in, and performing what they have learned. Curriculum developers should value the knowledge and experience of indigenous people and infuse it into AGRIS content. Indigenous knowledge imparts skills pertinent to an individual's socio-economic activities, for both immediate and long-term practices. Thus, AGRIS teachers should measure and observe psychomotor skills acquired through learning outcomes (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

Learning outcomes have to do with measurable skills and capabilities that learners should have accumulated upon completing a particular topic (Clark, Goodfellow, & Shoufani, 2020; Goh, Leong, Kasmin, Hii, & Tan, 2017; Paolini, 2015). Outcomes are embedded in teaching that is socially relevant to learners' real-life. This is confirmed by the study conducted by Joppe, Shen, and Veltri (2020) on infusing learning outcomes into a tourism curriculum. In this study, it is emphasised that learning outcomes are unpacked as per the topic. Learners learn about cultural and indigenous customs of knowing and being, guaranteeing that they obtain essential cultural proficiencies to construct a respectful relationship with indigenous inhabitants, anywhere their career may take them. AGRIS teachers should therefore understand that learning outcomes are based on constructing knowledge, evolving skills, and transforming attitudes. Teachers should discern how economic, cultural, and political factors influence learners' experiences. In this regard, curriculum developers should develop an AGRIS curriculum that involves learning outcomes that could bridge the gaps and be employed within a specific educational context. The AGRIS curriculum should embrace content that will allow teachers to focus on capacitating learners with skills and adjusting attitudes for learners. However, the construction of knowledge should be inherently social and authentic. Learners may achieve learning outcomes if teachers use software tools during teaching (Khoza, 2019b; Khoza & Biyela, 2020; Mpungose, 2020a).

SW tools are imperative for promoting and creating a conducive platform for learners to share and discuss subject content in their language vocabulary (Khoza, 2017b; Mpungose, 2020a). Makumane and Khoza (2020) allude to SW tools as having programming codes that are freely available for learners to obtain societal skills. Programming codes assist learners

to communicate with the subject in order to construct new knowledge while attaining learning outcomes. In this regard, learners take control over what they want to learn, and how and where to learn (Mpungose, 2020c). SW tools are thus of vital importance in addressing the needs of society during AGRIS teaching in secondary schools. These tools provide podiums on which learners can discuss, create, and exchange their experiences. These tools are not meant to push the boundaries of the performance-based curriculum: they are driven by a communal perspective. Therefore, SW tools oblige AGRIS teachers to act as facilitators.

Facilitator actions are mainly driven by creating a conducive teaching milieu that promotes active participation, social conversations, and contributions to stimulate effective teaching (Evans, Knight, Walker, & Sutherland-Smith, 2019; Martin, Wang, & Sadaf, 2020). The effective enactment of this role relies on the proper selection of pertinent teaching materials and feedback, and authorising self-regulated learning (Tosterud, Kjolberg, Kongshaug, & Haugom, 2020). AGRIS teachers should therefore be mediators during the construction of knowledge by learners. Thus, society/learners' needs dominate the discussions in which opinions and real-life experiences are involved. The facilitator action draws from a communal perspective and compels the teacher to employ a learner-centred method in the classroom.

A learner-centred method is an approach that shifts the focus of teaching from the teacher to the learner as a core actor who is motivated and able to think critically in order to solve problems (E. du Plessis, 2020; Logeswaran, Munch, Chong, Ralph, & McCrossnan, 2020). The learner-centred method enables learners to develop at own pace to attain total capacity (Payaprom & Payaprom, 2020). Pereira and Sithole (2020) claim that this method effectively enhances the capability and qualities of any subject. This suggests that in AGRIS, a learner-centred method may be used to integrate historical meaning, while adapting to changing social, cultural, and educational needs of today. Be that as it may, AGRIS teachers need not view this method as reducing the vital role of other methods. Instead, it widens the AGRIS practice, involving other activities that generate excellent learners' outcomes. Thus, the enactment of a learner-centred method calls for peer assessment.

Peer assessment implies that learners assess each others' work using preordained criteria such as a rubric, rather than a marking memorandum (Double, McGrane, & Hopfenbeck, 2020; Mpungose-, 2018). The evaluative proficiency of learners may thus occur (McGrath, Scott, & Logue, 2020) while delivering feedback effectively and efficiently to other learners. In this case, peer assessment enables teachers to develop learners' abilities to make judgements and to evaluate usefully. In addition, learners are able to utilise the provided feedback to minimise the gap between the feedback provided and the feedback employed (Double et al., 2020; Ibarra-Saiz, Rodriguez-Gomez, & Bood, 2020). This type of assessment motivates learners to think for themselves; to take complete control of their learning, enhancing their self-confidence, and understanding their subject better (Hala, 2020; Han & Chan, 2020). In AGRIS, peer assessment may capacitate learners to learn a skill, which positively impacts skills required in a changing future. Overall, peer assessment encourages learners to be independent in learning necessary skills. Thus, for effective enactment of peer assessment, AGRIS teachers should consider the online milieu.

The online milieu inspires learners to explore and participate with the content, incorporating experiences from their environment into those of the classroom (Tanis, 2020; van Halem, van Klaveren, Schmitz, & Cornelisz, 2020). On the one hand, the online milieu stimulates efficient interaction with the learners via social networks, which operate without close/physical contact (Amiti, 2020). On the other hand, the milieu promotes fruitful communication between compatible peers who can widen and intensify their skills and abilities in their selected careers (Peacock, Cowan, Irvine, & Williams, 2020). The online milieu improves learners' experiences and attainment of learning outcomes, while promoting interaction, building a sense of community, and providing an opportunity for learners from various settings to participate. In AGRIS, this milieu may stimulate effective sharing of opinions, deepening understanding of indigenous practices from various locations. Thus, understanding habitual and communal perspectives directs us to the paramount importance of a branch as a prescriptive perspective.

Branches, leaves, and flowers symbolise a *prescriptive perspective*. The flourishing of a tree is detected through the development of branches wherein green leaves and blossoming flowers occur. Branches act as a canopy, holding the leaves up to the sun, enabling

photosynthesis to occur, and blossoms to develop. Without branches, plants cannot manufacture food. Without photosynthesis, there would be no life, photosynthesis producing oxygen. In this regard, branches hold the subject needs, representing the blooming knowledge about the subject. Content knowledge adds value in knowledge application and AGRIS scientific knowledge. A tree is declared stable, mature, or ideal if the roots, stem, and branches are well developed. Thus, for teachers to inculcate adequate knowledge to learners, they need to possess in-depth content knowledge.

Content knowledge is the specialised knowledge of AGRIS used in the teaching profession, which is characterised by rules and procedures stipulated by the national examination committee (Appova & Taylor, 2020). This knowledge is driven by specific topics teachers must teach using explicit concepts embraced by the subject (Ogbonnaya, Mji, Mafa-Theledi, & Ngulube, 2020). Hidayat and Setyawan (2020) articulate that content knowledge encourages the transmission of subject matter and is not concerned about encouraging learners to think critically. Content knowledge is the scientific knowledge that AGRIS teachers have obtained from books. Content knowledge in agriculture relates to high-quality AGRIS instruction, which would enable teachers to fulfil curriculum developers' needs. AGRIS teachers should therefore advocate for the implementation of objectives during their teaching process.

Objectives serve as a yardstick to assess the teaching process. Objectives are driven by high-stakes examinations, which are of significance to learners, determining promotion to the next grade (Matorevhu, 2020). In the same light, objectives enable the teacher to focus on content learners need to know (Nazim, 2020) − content knowledge (Fiesler, Garrette, & Beard, 2020). Objectives are driven by a set of policies and documentation from national curriculum developers. Objectives should ensure that curriculum developers' intentions are met. Teachers should adhere to intended documents to ensure that objectives are met. As a result, AGRIS teachers should employ hardware tools for the effective implementation of objectives.

Hardware tools belong to technological knowledge: they are the tools that draw from the conscious mind (Khoza & Biyela, 2020; Mpungose, 2020b). Examples are textbooks, previous examination papers, worksheets, and laptops employed by AGRIS teachers during data generation. These tools are tangible, and utilised to instruct learners on what to do for each topic. In AGRIS, HW tools are employed to assist learners in passing tests and examinations. Learners therefore master intended content to fulfil the requirements of the AGRIS curriculum. AGRIS teachers usually act as instructors during the implementation of HW tools.

An instructor is a subject specialist with in-depth knowledge of the subject (Makumane, 2018). An instructors' main concern is to disseminate content knowledge in a manner that saves time (Shibani, Knight, & Buckingham Shum, 2020). This is because instructors have to complete the intended content within a stipulated time. Instructors believe in explaining concepts and giving instruction during their teaching. Instructors seem to care less about engaging learners during their teaching process. Consequently, instructors always employ discipline/content-centred methods during their classroom practice.

The discipline-centred method is embedded in cognitive activities based on AGRIS concepts enhancing learners' formal thinking (Mpungose, 2020b). This method places the content at the centre to meet the needs of the curriculum developers and that of content objectives (Mearns & Platteel, 2020). The performance-based curriculum compels teachers to adhere to vertical knowledge, explicit concepts, and grammar relevant for AGRIS, assisting learners to master content knowledge cognitively. In this regard, the road to good AGRIS teacher performance depends on the effective use of this method. Thus, the utilisation of discipline-centred methods leads to a summative assessment.

Summative assessment is employed to measure and quantify the learning attainment of learners at a specific time. This assessment type becomes the only tool to measure learners' performance (Ahmad, 2020). This assessment is meant to assess knowledge through written tests, examinations, and assignments (Septi, Paramartha, & Wahyuni, 2020). A summative assessment is suitable for assessing the amount of knowledge gained by learners. The

method neglects the assessment of skills and attitudes.This assessment draws from the cognitive domain and overlooks psychomotor and affective domains. It permits AGRIS teachers to dwell much on the face-to-face milieu.

A face-to-face milieu is seen in an environment wherein the teacher is always visible to the learners. Learners pay attention to the teacher while allowing the teacher to implement appropriate strategies to keep learners attentive (Zhang, 2020). The face-to-face milieu calls for in-depth preparation of the lesson embedded in designed policies. In the same light, in this milieu, teachers and learners are present in person in the same setting. Teachers monitor and observe learners working according to books and within a specified time.

8.5 Conclusion of the Chapter

I have presented theory in calling for a quality and balanced curriculum while bringing transformation and improvement within the practice. In my conclusion, I shall analyse my recommendations in the form of three propositions, which have been articulated as an apposite means of transforming the South African AGRIS curriculum.

Proposition One

The South African AGRIS curricular delivery in secondary schools should not be based on the acquisition of scientific knowledge. Traditional methods are of significance to teachers in preparing for the challenges of the future. Nonetheless, the Department of Education should ensure the attracting and maintaining of good quality teachers committed to education and sustainable rural development, and who are well versed in their subject to lead teachers in agriculture. Further to this, agricultural sciences faculties should offer training in new concepts, approaches, and skills needed to implement any anticipated change and to augment competence in the approaches.

Proposition Two

The South African AGRIS curriculum should possess social consciousness and be connected and committed to rural societies. There is a need for curriculum developers to review the

AGRIS curriculum. For instance, the curriculum design should involve teachers, learners, and external stakeholders such as farmers, agro-industry, business persons, government, and civil society. In the same light, the reviewed curriculum should emphasise the importance of entrepreneurial skills, including real-life experiences in designing and operating a profitable enterprise. Such would prepare learners for careers in the private sector, particularly as independent entrepreneurs. In order to attain such, the AGRIS curriculum should embrace a learner-centred method, which allows learners to actively participate, and to work in groups. This would be preferable to making teachers mere technicians imparting scientific knowledge to learners.

Proposition Three

To instil positive attitudes in learners, learners should be guided by strong positive values and intense ethical standards. In addition to this, they should be committed to a new vision of agricultural production attuned to the natural environment and conservation of biodiversity. AGRIS teachers should possess solid practical experience critical to developing confidence, which in turn would assist learners to solve problems that they may encounter in the workforce. The Department of Education should ensure that AGRIS teachers are life-long researchers capable of taking advantage of germane new information. Life-long researchers would produce learners with strong leadership, having interpersonal and strong communication skills, including effective utilisation of international business language and information technology.

The above propositions conclude my views on the PCHP theory. Little has been done to bring balance to the quality of the South African AGRIS curriculum. My intention is not to condemn the AGRIS curriculum structure. However, fundamental interest is directly based on teacher transformation and subject improvement. Mpungose (2018), Khoza (2019), and Mpungose (2020b) concur that a balanced and quality curriculum is guaranteed if professional, society, and personal issues are placed at the core of any curriculum. I believe that the PCHP theory may bring about intense transformation within the AGRIS curriculum. This theory intertwines the prescriptive, communal, and habitual perspectives in order to assist teachers to capacitate learners with adequate knowledge, skills, and attitudes/interests. The South African AGRIS CAPS document does mention all three aspects of teaching;

however, it does not elaborate on how teachers (using skills and interests) should enact these aspects. Nonetheless, the PCHP theory has the potential to transform and improve the AGRIS practice.

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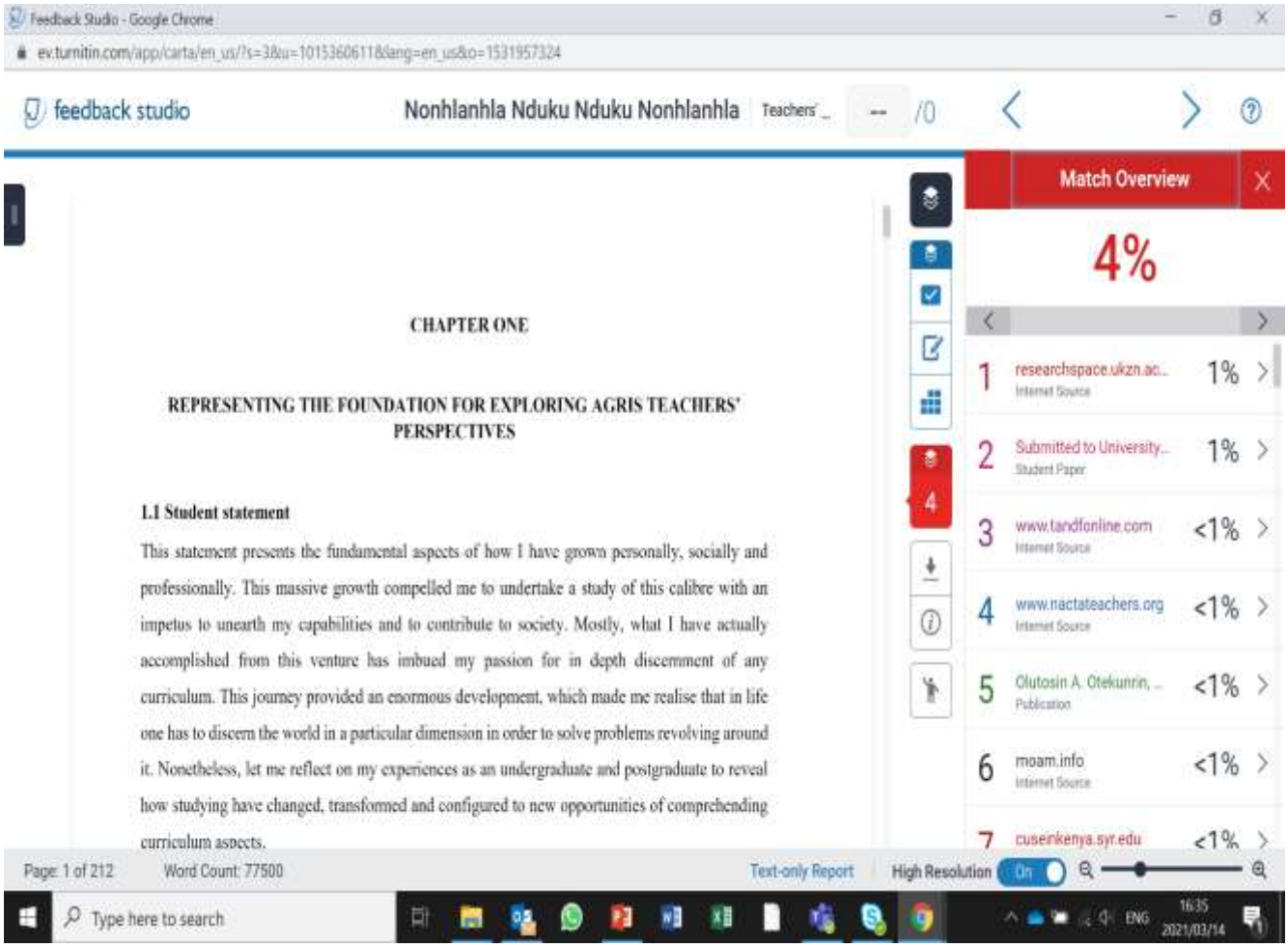
ANNEXURES

Annexure A: Turnitin report



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Page count:	212
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CHAPTER ONE

REPRESENTING THE FOUNDATION FOR EXPLORING AGRIS TEACHERS' PERSPECTIVES

1.1 Student statement

This statement presents the fundamental aspects of how I have grown personally, socially and professionally. This massive growth compelled me to undertake a study of this calibre with an impetus to unearth my capabilities and to contribute to society. Mostly, what I have actually accomplished from this venture has imbued my passion for in depth discernment of any curriculum. This journey provided an enormous development, which made me realise that in life one has to discern the world in a particular dimension in order to solve problems revolving around it. Nonetheless, let me reflect on my experiences as an undergraduate and postgraduate to reveal how studying have changed, transformed and reconfigured to new opportunities of comprehending curriculum aspects.

Apart from being an Agricultural Sciences teacher, my initial development was positively impacted by contextual studies which I did during ABET course. This course provided me with in depth understanding of learners' status quo and different backgrounds they are coming from. Further to this, I studied Educational Technology in Education, which made me understand the significant importance of integrating technology in my teaching. Consequently, I am an Agricultural Sciences expert/content expert, an advisor and coach to my learners and that persuaded me to register for Master's Degree in Education. This qualification made me to realise the pivotal role played by responsiveness to learners' context, social and personal/habitual needs, it imparted numerous values in me, and taught me several aspects about education and research. Today, I understand that I should base my teaching base on personal, social and professional rationale. Nevertheless, this degree brought an in depth understanding that the AGRIS curriculum is driven by prescribed/performance/planned curriculum. As a result, I have to implement it as planned by following set policies and formal documentations. On the other hand, involving the curriculum signals as they oppose to the curricular spider web by van der Akker (2009).

1

Annexure B: Ethical clearance letter

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

14 February 2020

Mrs Nonhlanhla Fortunate Nduku (205520529)
School of Education
Edgewood Campus

Dear Mrs Nduku,

Protocol reference number : HSS/0583/019D
Project title: An Emancipatory Action Research of Teachers' Perspectives of Teaching Agricultural Sciences in Secondary Schools in Two Districts, KwaZulu-Natal Province

Full Approval – Expedited Application

In response to your application received 3 May 2019, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 1 year from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

[redacted]
.....
Dr Shamila Naidoo (Chair)

/dd

Humanities & Social Sciences Research Ethics Committee
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 **Facsimile:** +27 (0) 31 260 4609 **Email:** [redacted]
Website: www.ukzn.ac.za

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Annexure C: Gate keeper letter

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Phindile Duma Tel: 033 392 1063 Ref:2/4/8/1777

Mrs NF Nduku
G107 Nokhenke Road
PO KwaMashu
4360

Dear Mrs Nduku

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"AN EMANCIPATORY ACTION RESEARCH OF TEACHERS' PERSPECTIVES OF TEACHING AGRICULTURIAL SCIENCES IN TWO DISTRICTS, KWAZULU-NATAL PROVINCE"**, in the KwaZulu-Natal Department of Education institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 06 May 2019 to 04 January 2022.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Phindile Duma at the contact numbers below.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

UMlazi District Pinetown District

[redacted]

Dr. EV Ndama
Head of Department: Education
Date: 10 May 2019

Annexure D: Consent letter

Consent form for teachers

Nduku NF (Mrs)

G 107 Nokhenke Road

P.O KwaMashu

4360

Dear Participant (educator)

INFORMED CONSENT LETTER

I am Nonhlanhla Fortunate Nduku, a candidate studying for Doctoral Degree in Curriculum Studies at the University of KwaZulu-Natal, Edgewood campus, Pinetown, South Africa. I am conducting a study to explore **teachers' perspectives of teaching Agricultural Sciences in secondary schools**. I have observed that in spite of several capacitating workshops, Agricultural sciences performance declines to reach highest level. I am doing an action research, thus I am also involved in doing this research and I am also teaching agricultural sciences at Mqhawe High School. Therefore, to gather all the information to successfully complete my studies, I am kindly requesting you to answer some questions based on your experiences as an Agricultural Sciences educator.

Please note that:

- Your confidentiality is guaranteed as your contributions will not be attributed to you in person, but reported only as population member option.
- The interview, reflective activity and focus group discussion may last for about 1 hour.
- Any information given cannot be used against the school, and the collected data will **ONLY** be used for purposes of this research.
- There will be no limit on any benefit that you may receive as part of participation in this research project;
- Data will be stored in secure storage and destroyed after 5 years.
- You have a choice to participate, not participate or stop participating in the research. You will not be penalized for taking such an action.
- You are free to withdraw from the research at any time without any negative or undesirable consequences;
- Your real names will not be used, but symbols such as A, B, C, D, E and F will be used.
- The research aims at knowing the challenges of your community relating to scarcity, peoples' movement, and effects on peace.

- School and educators' involvement is purely for academic purposes only, and there are no financial benefits involved.
- If you agree to be interviewed, please indicate by ticking whether you agree or not, to be recorded by the following equipment
-

The following work plan will be used to complete this research project:

Equipment	**Willing**	**Not Willing**
Tape recorder		

I can be contacted at:
Cell: 0829202935
Email: nfnduku@gmail.com

My supervisor is Dr. SB Khoza who is located at the School of Education, Edgewood campus of the University of KwaZulu-Natal.
Contact details: email: khozas@ukzn.ac.za Phone number: 0312607595.

Discipline Co-ordinator is Dr N Nzimande
Curriculum Studies, School of Education,
Edgewood College, University of KwaZulu-Natal
(Tel) 0312602470 (Cell) 0822022524, Email: maharajhlr@ukzn.ac.za

You may also contact the Research Office through:
Ximba Phumelele
HSSREC Research Office,
Tel: 031 260 3587 E-mail: ximbap@ukzn.ac.za

Thank you for your contribution to this research.

DECLARATION

I…… (Full names of Participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participate in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I desire.

…… **……**

SIGNATURE OF PARTICIPANT DATE

Annexure E: Reflective activity

Reflective Activity

This Reflective Activity is for reflections. This activity will require you to state the ways in which you view (perspectives) Agricultural Sciences curriculum. You may use various sources to complete this activity. Presents your reflections by following questions as follows.

1. Why are you having particular perspectives for teaching Agricultural Sciences?
   _____
   _____
   _____

2. Towards which outcomes are you applying perspectives to teach Agricultural Sciences?
   _____
   _____
   _____

3. What are you teaching via perspectives (Object)?
   _____
   _____
   _____

4. What teaching methods you use during teaching and learning?
   _____
   _____
   _____

5. How are you applying perspectives (Division of labour) during teaching and learning?
   _____
   _____
   _____

6. With what are you teaching (Tools) when applying perspectives?
   _____
   _____
   _____

7. How are you facilitating teaching (Actor's role) in the classroom?
   _____
   _____
   _____

8. With whom are you teaching (community) when applying perspectives?
   _____
   _____
   _____

9. Where are you teaching (Environment) when applying perspectives?

_____
_____
_____

10. How do you assess your teaching (Rules) when applying perspectives?

_____
_____
_____

Annexure F: Interview schedule

One-on-one (individual) semi-structured interviews

These are scheduled questions seeking your perspectives of teaching Agricultural Sciences in schools.

1. Why are you having particular perspectives for teaching Agricultural Sciences?
2. Towards which outcomes are applying perspectives to teach Agricultural Sciences?
3. What are you teaching via perspectives (Object)?
4. What teaching methods you use during teaching and learning?
5. How are you applying (Division of labour) perspectives during teaching and learning?
6. With what are you teaching (Tools) when applying perspectives?
7. How are you facilitating teaching (Actor's role) in the classroom?
8. With whom are you teaching (community) when applying perspectives?
9. Where are you teaching (Environment) when applying perspectives?
10. How do you assess your teaching (Rules) when applying perspectives?

Annexure G: Observation schedule

The following will guide the observation process:

1. What are the intentions of an individual actor during teaching and learning (outcomes)?

2. What perspective the actor applies during object delivery.

3. What teaching methods actors use to teach?

4. Why actors have particular perspectives of teaching Agricultural Sciences?

5. How individual actor applies perspectives during teaching of Agricultural Sciences?

6. How do actors divide labour (teacher-centred, learner-centred, and content-centred) During teaching and learning of Agricultural Sciences?

7. What tools (hard-ware, soft-ware, ideological-ware) that teacher uses during teaching and learning of Agricultural Sciences?

8. How actors act (instructor, facilitator, assessor) during teaching and learning of Agricultural Sciences?

9. Where Agricultural Sciences teaching and learning takes place (environment)?

10. What is the teaching time (Rule) for Agricultural Sciences?

11. What types of rules do actors follow when assessing learners Agricultural Sciences' learners?

Observation evaluation sheet

	Concepts	**Prepositions**	**Remarks**
1.	Teachers' intentions/aspirations of teaching	• Aims • Objectives • Outcomes	
2.	Agricultural Sciences Grade 12 content	**Paper 1:** • Animal Nutrition • Animal production • Animal reproduction • Animal health • Artificial insemination and Cloning • Fertilisation, Pregnancy, Gestation and Parturition • Plant poisoning • Animal diseases, protection and control **Paper 2:** • Basic genetics • Production Factors • Agricultural Marketing	

		• Management • Demand and supply • Budget, Cash Flow, Income Statement • Entrepreneurship and Business Planning • Types of Marketing Systems	
3.	Teaching methods used to teach	• Teacher-centred • Learner-centred • Content-centred	
4.	Types of activities used	• Teacher-centred • Learner-centred • Content-centred	
5.	Tools used to teach	• Hard-ware • Soft-ware • Ideological-ware	
6.	Teachers' action during teaching and learning	• Instructor • Facilitator • Assessor	
7.	Milieu where teaching and learning occur	• Face-to-face • Online • Blended	

8.	Time allocated for teaching	• Hour • Day • Week	
9.	Types of Assessments used to assess	• Formative • Summative • Peer-assessment	

Annexure H: Focus group schedule

These are the focus group questions seeking your perspectives of teaching Agricultural Sciences in schools.

1. Why are you having particular perspectives for teaching Agricultural Sciences?
2. Towards which outcomes are applying perspectives to teach Agricultural Sciences?
3. What are you teaching via perspectives (Object)?
4. What teaching methods you use during teaching and learning?
5. How are you applying (Division of labour) perspectives during teaching and learning?
6. With what are you teaching (Tools) when applying perspectives?
7. How are you facilitating teaching (Actor's role) in the classroom?
8. With whom are you teaching (Community) when applying perspectives?
9. Where are you teaching (Environment) when applying perspectives?
10. How do you assess your teaching (Rules) when applying perspectives?

Annexure H: Letter of edit