TEACHERS' CHALLENGES AND EXPERIENCES WHEN PLANNING AND PRESENTING AGRICULTURAL SCIENCES THEORY AND PRACTICAL LESSONS IN LEBOPO CIRCUIT, CAPRICORN SOUTH DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA

By

SHIBAMBE LEFT

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DECLARATION

I, Shibambe Left, declare that the dissertation titled: **TEACHERS' CHALLENGES AND EXPERIENCES WHEN PLANNING AND PRESENTING AGRICULTURAL SCIENCES THEORY AND PRACTICAL LESSONS IN LEBOPO CIRCUIT, CAPRICORN SOUTH DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA,** hereby submitted to the University of Limpopo, for the degree of Master of Education (Sciences Education), has not been previously been submitted by me for a degree at this or any other university; that this is my work in design and in education, and that all material contained here has been duly acknowledged.

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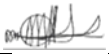
Signature: 

Date: 05 March 2025

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Date: 05 March 2025

DEDICATION

This research is dedicated to the following people; my cherished mother, Ndzaheni Johanna Malandzela; my sister, Peggy Goodness Maluleke and my lovely younger sister, Irish Shibambe Mhana Vun'we, who have all passed on. May your souls continue to rest in perfect peace.

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ACRONYMS AND ABBREVIATION

ADHD- ATTENTION DEFICIT HYPERACTIVITY DISORDER

GDP- GROSS DOMESTIC PRODUCT

FET- FURTHER EDUCATION AND TRAINING

CAPS- CURRICULUM AND ASSESSMENT POLICY STATEMENT

GET- GENERAL EDUCATION AND TRAINING

DBE- DEPARTMENT OF BASIC EDUCATION

SMT- SCHOOL MANAGEMENT TEAM

LDoE- LIMPOPO DEPARTMENT OF EDUCATION

NCS- NATIONAL CURRICULUM STATEMENT

POPI ACT- PROTECTION OF PERSONAL INFORMATION

SMART- SPECIFIC MEASURABLE ACHIEVABLE RELEVANT TIME-BOUND.

ABSTRACT

Agricultural Sciences teachers should embrace theoretical and practical lessons during teaching and learning process to produce competent learners for the South African economy and agricultural industries. Agricultural Sciences teachers need to be well equipped with skills and knowledge of the subject to produce learners who will remain relevant in the South African economy and industries. The study has opted for qualitative research approach underpinned by interpretivism paradigm. The study was carried out in 5 secondary schools of Capricorn South. The purpose of this study was to explore teachers' challenges and experiences when planning and presenting Agricultural Sciences theory and practical lessons in Lebopo Circuit, Capricorn South District, Limpopo Province, South Africa. It had been identified that Agricultural Sciences teachers are faced by numerous challenges when planning and teaching the subject. Purposive sampling was used in identifying five Agricultural Sciences teachers in Lebopo circuit who participated in the study. Data collection instruments employed in the study were document analysis, semi-structured interviews, field note and non-participating observation. Collected data were analysed through the use of interpretative analysis and document analysis for lesson plans. Clark and Peterson (1986) as well as Mitzel (1969) informed the conceptual framework that guided the study. The findings of the study revealed that most Agricultural Sciences teachers do not use lesson plans in teaching and learning. Furthermore, the study also established that some of teachers lack pedagogical strategies and assessment skills. The study also discovered that the lack of teaching and learning resources leads to poor practical lesson, failure to attain some of the lesson objectives and badly affect learners' academic performance. The study has recommended that Agricultural Sciences teachers should attend content, policy and practical workshops to improve their skills in teaching and learning. Most important, teachers should undergo continuous profession development training on how to plan and teach theory and practical lessons. Furthermore, the study has also recommended that Agricultural Sciences should be introduced in primary and GET level in order to produce more and boost economy.

Key words: Assessment; practical skills and knowledge; lesson planning and presenting

Discipline: Agricultural Sciences and vocational education.

CHAPTER ONE

OVERVIEW INTRODUCTION

1.1 Introduction of the chapter

Agricultural Science is considered to be the most important subject as it provides learners with skills and knowledge from the classroom teaching and learning of theory and practical lessons. The knowledge obtained from the classroom will be used in agricultural sector in boosting the economy and producing food for people and animals. This study explored the difficulties experienced by teachers while preparing and delivering theoretical and practical lessons of Agricultural Sciences in ordinary secondary schools of South Africa (Joly, Colinet, Gaunand, Lemarié, & Matt, 2016). Young and Edwards (2011) discovered that by preparing learners to enter the workforce or pursue further education and training in agricultural industry, secondary school Agricultural Sciences teaching is thought to play a crucial role in fostering rapid economic growth by enabling young people to take part more fully in both their own and society's social development. Therefore, Agricultural Sciences plays a crucial role in the Gross Domestic Product (GDP) of South Africa. Agricultural Sciences is essential in guaranteeing food security, environmentally friendly agricultural methods, and the general wellbeing of society. Agricultural Sciences contributes to the increase in agricultural productivity and crop yields, guaranteeing a sufficient supply of food to fulfill the requirements of the expanding world population (Morris, 2019). For teaching and learning in Agricultural Sciences to be successful, lesson planning by teachers is essential before the teaching and learning process.

Lesson plans give teachers the ability to conduct thorough and interesting Agricultural Sciences teaching and learning because they bring structure, clarity, customisation, and engagement in the classroom (Department of Basic Education [DBE], 2021). Lesson plans aid teachers in time management, curriculum alignment, learning assessment, and continuity of instruction, all of which contribute to learners' increased understanding and appreciation of Agricultural Sciences (Myers, Dyer & Washburn, 2014). Lovat and Smith (2003) discovered that a disciplined framework for organising and presenting Agricultural Sciences curricula is provided by lesson plans. Lesson plans provide an overview of the learning objectives, teaching approaches, and evaluation techniques, ensuring that crucial ideas and abilities are covered

methodically (Rao, 2012). This framework aids teachers in maintaining a concentrated and cogent learning environment in Agricultural Sciences (Morris, 2019).

1.2 Background of the study

The majority of Agricultural Sciences teachers still find lesson planning difficult to construct before teaching and learning take place (Williams & Dollisso, 2018). Devers and Frankel (2000) discovered that transition from a teacher training and becoming an effective teacher is a difficult endeavour in the education profession for Agricultural Sciences teachers. This is because Agricultural Sciences teachers encounter many difficulties when planning and presenting practical and theoretical lessons (Carpenter, 2012). A majority of Agricultural Sciences teachers still struggle with the connection between the crucial functions that lesson plans play in an efficient teaching and learning process (Alexander & Faludi 1989). Knowing that a significant portion of Agricultural Sciences teachers enrolled in the teachers' education programme experience difficulties with lesson planning and instruction is concerning for the DBE (Mbokazi & Lebeloane, 2022).

Dollisso (2018) believes that lesson planning offers detailed instructions throughout the teaching of Agricultural Sciences theory and practice. A lesson plan ensures that Agricultural Sciences have direction during teaching and learning, which help in time management. Agricultural Sciences lesson plan specifies the teaching strategy to be utilised for the lesson, the content to be covered, and the order in which the material should be delivered during teaching and learning (Abdulhamid, 2015). Carpenter (2012) indicates that learners' attitude in the classroom also influences the delivery of the lesson. Factors such as the number of learners in a classroom, a daily class timetable that requires the teacher to see learners, a lack of practical resources, the level of education in terms of funds for the subject, and the realistic expectations of teachers by society are also factors affecting the lesson planning (Bada & Olusegun, 2015). A high learner-teacher ratio in the classroom, the work environment, and the emotional conditions of Agricultural Sciences teachers can all have an impact on lesson planning and all these factors can lead to poor academic performance in the subject.

These challenges faced by Agricultural Sciences teachers in lesson planning and presenting in classroom affect the normal functioning of education in the teaching

fraternity (Dyer & Osborne, 2012). These difficulties can lead to poor academic performance among learners (Kidane & Worth, 2012). Teaching and mastering Agricultural Sciences in secondary schools is crucial since it provides a majority of people in rural South Africa and other African countries with their primary source of income and food (Myers et al., 2014). Before and after independence, Agricultural Sciences was taught as a subject with the overarching goal of developing fundamental agricultural skills applicable to South Africa and the learner's local setting. Yopp, McKim and Homeyer (2016) indicate that the objectives of teaching Agricultural Sciences in line with the curriculum for secondary schools in South Africa are to increase interest in and knowledge of the potential in agriculture as well as to show that farming is a respectable and lucrative profession (Lovat & Smith, 2003).

A teacher plays a key role in the classroom of South African schools on a daily basis in the teaching and learning process. During the teaching and learning of both theoretical and practice, an Agricultural Sciences teacher is a source of knowledge and information (Akanmu et al., 2016). Due to the responsibilities of this position, a teacher must be an authority on the subject and ensure that learners exhibit the appropriate level of proficiency in Agricultural Sciences (Kabugi, 2013). Preparing a lesson plan is one of the typical responses offered by Agricultural Sciences teachers in various literatures when questioned about the challenges and experiences they face when practicing their craft (Doyle & Holm, 1998). Joly et al., (2016) discovered that some teachers with experiences and capable of mentoring novice teachers say that few teachers lack the knowledge necessary to create lesson plans, despite the fact that they were supposed to be taught the ideas and techniques they would employ while teaching learners in Agricultural Sciences. The main objective of the lesson plan is to deliver a decent and orderly message to learners in the classroom in a form a lesson where teaching and learning takes place.

Poor lesson planning can have a negative impact on academic performance in Agricultural Sciences, which can affect learners' choice of the subject in Further Education and Training (FET) and outcomes (DBE, 2011). The motive behind conducting this study was to highlight the importance of Agriculture in South Africa's socioeconomic development, which cannot be overstated (Egun, 2015). Hinkson (2013) indicates that Agriculture is recognised as one of the most important pillars of human survival in many countries; hence, this study sought to correct the problems

faced by Agricultural Sciences teachers when planning and presenting both theoretical and practical lessons. This has resulted in the inclusion of Agricultural Sciences education at all levels of the education system. Morris (2019) argues that the theoretical learning of Agricultural Sciences takes place in the classroom since it offers learners with the knowledge and skills they need to practice primary agriculture. The relationship between classroom and practical Agricultural Sciences lessons should be strong, clear, deliberate, and intentional (Olowa, 2012).

Kabugi (2013) stipulates that Agricultural Sciences frequently need certain tools, such laboratory supplies, farm infrastructure, and outing options. However, not all educational institutions or schools have access to sufficient resources, which might make it difficult for teachers to prepare and present thorough practical and theoretical lessons (Thom, 2020). Lack of resources might limit experiential learning opportunities and make it difficult to effectively teach the Agricultural Sciences subject (Masha & Maphuta, 2022). Time restrictions are a common problem for teachers while preparing and teaching Agricultural Science classes. There is a tremendous proportion of material to cover, both theoretical and practical (Brown, Cheffers & John, 1991). While making sure that learners understand the crucial ideas, it can be difficult to strike a balance between the time allowed for theory instruction and practical tasks in Agricultural Sciences. Due to additional administrative duties and instructional obligations, Agricultural Sciences teachers may also have less time to prepare lessons before teaching and learning takes places (Olowa, 2012).

1.3 Research problem

Agricultural Sciences is a key to agricultural sector which will lead to production of many products in various agricultural sector and will be boosting the South African economy. The subject become more effective if it caters for both practical and theoretical lessons during teaching and learning. then identifying various challenges teachers faces when planning and presenting Agricultural Sciences need to be well addressed through finding solutions to the problems teachers face. Egun (2015) argues that a teacher can benefit from lesson planning by being well prepared and aware of what he or she intends to teach the learners in Agricultural Sciences. Yopp, McKim and Homeyer (2016) argue that planning lessons beforehand results in more cohesive lessons during teaching process. Ideally, it is expected that Agricultural

Sciences teachers should be able to plan learning activities that use science rules and methods to solve agricultural-related problems (DBE, 2020). It provides teachers with the chance to carefully consider their choice of lesson objectives, the types of activities that would accomplish these objectives, the sequencing of those activities, the material needed, the potential length of each activity and how learners should be grouped. Thus, a good Agricultural Sciences lesson will follow in classroom derived from a well-crafted lesson plan document by a teacher (Olowa, 2012).

Currently, there are minimal studies which provide solutions for challenges faced by Agricultural Sciences teachers in lesson planning and the teaching of both theory and practical; hence, this study sought to close this gap (Kabugi, 2013). Agricultural Sciences teachers currently face a number of challenges during lesson planning and teaching, which ultimately affects the outcomes of the lessons (Smalley & Smith, 2017). This includes poor articulation of instructional objectives, failure to address and integrate crucial lesson plan elements such as learning objectives, learning activities, assessment, poor development of assessment procedures, and a lack of teaching and learning resources in the subject (Dyer & Osborne, 2012). This signifies that challenges faced by teachers in planning and presenting theory and practical lesson may lead to learners' poor academic performance in Agricultural Sciences (Akanmu et al., 2016). Hence, the researcher explored teachers' challenges and experiences when planning and presenting the theory and practical lessons of Agricultural Sciences.

1.4 Purpose of the study

The purpose of the study was to explore teachers' challenges and experiences when planning and presenting Agricultural Sciences theory and practical lessons.

1.5 The study will focus on the following objectives:

1.5.1 To identify and categorize challenges encountered by high school Agricultural Sciences teachers while planning and presenting lesson.

5.2.2 To identify how challenges encountered during planning and teaching affect learners academic performance in Agricultural Sciences

5.2.3 To identify teacher's perspective on the problems encountered in Agricultural Sciences during teaching and learning.

1.6 Research Questions

1.6.1 What are the challenges that teachers encounter when planning and presenting lessons in Agricultural Sciences?

1.6.2 What are the teachers' experiences in planning and presenting theory and practical lessons in Agricultural Sciences?

1.6.3 How do teachers view their challenges when planning and presenting Agricultural Sciences lessons?

1.7 Significance of the study

This study is significant in closing the gap in the teaching and learning fraternity by identifying problems and providing solutions to the challenges faced by Agricultural Sciences teachers when planning and presenting theory and practical lessons in the classroom. It does this by exploring experiences and challenges encountered by secondary school Agricultural Sciences teachers during the planning and presenting theory and practical lessons. In addition, the researcher provides an appropriate opportunity for the DBE and other educational stakeholders to learn about the issues faced by Agricultural Sciences teachers when planning and presenting theoretical and practical lessons in secondary schools.

Additionally, it will enable the DBE in providing the required and sufficient resources to support the teaching and learning of Agricultural Sciences. Agricultural Sciences teachers will find this study beneficial as it will guide them on how to overcome the challenges they face in teaching the subject and how it can increase learners' enrolment in the subject.

1.8 Assumption of the study

Among the presumptions made in this study were;

1.8.1 The date supplied by the participants in this study using research instruments were correct and reliable.

1.8.2 The participants participated freely without fear or undesired biases.

1.8.3 The researcher was able to identify the challenges and experiences faced by Agricultural Sciences teachers when planning and presenting theoretical and practical lessons.

1.8.4 The researcher made some recommendations in terms of solutions, which can be used by other Agricultural Sciences teachers to solve and deal with this challenges affecting them in lesson planning and teaching.

1.9 Delimitation of the study

The researcher focused primarily on teachers' experiences and challenges when planning and presenting theoretical and practical lessons of Agricultural Sciences in secondary school. Since different teachers face various challenges during lesson planning, planning was used as a broad term to get all experiences from various teachers. There are many factors which may affect the teaching and learning of Agricultural Sciences lessons. This study was limited to only five Agricultural Sciences teachers in the Lebopo Circuit, and only three schools out of thirteen schools in the Circuit were considered.

1.10 Conceptual framework of the study

This study was guided by the Mitzel's (1969) theory, and the theory developed by Clark and Peterson (1986). These two theories were combined for this study because the theory by Clark and Peterson (1986) focused on the lesson planning of Agricultural Sciences. According to Clark and Peterson (1986), lesson planning is a fundamental psychological activity that enables teachers to see the future and build a framework to guide their future activities. Mitzel's (1969) theory advances the view that teaching involves an interplay among sets of variables.

Clark and Peterson's (1986) theory was utilised in this study to evaluate Agricultural Sciences teachers' experiences and challenges, and to explain the decision-making process that teachers engage in while designing Agricultural Sciences lessons. This idea was crucial to the researcher's goal of identifying the difficulties and problems that teachers face when preparing and delivering lessons in Agricultural Sciences, both theoretically and practically. The researcher's main concern was to explore experiences and challenges faced by Agricultural Sciences teachers during lesson planning and teaching of theoretical and practical lessons. By using an outcomes-based instructional approach, this framework aims to create a new understanding of the relationship between planning and executing Agricultural Sciences in the classroom. This study attempted to comprehend the experiences and difficulties Agricultural Sciences teachers confront when developing and delivering theoretical

and practical classes. According to Clark and Peterson (1986), teacher planning has been identified as a key area in which instructors make a number of choices concerning the instructional strategies that would result in the achievement of the targeted learning goals.

Borich (2000*)* addresses the topic of planning in terms of means end behaviour, which eventually becomes consciously anticipatory. He saw it as a psychological process that depended on a teacher's ability to make decisions. Teachers must use cognitive thinking while creating lessons and executing them so that learners learn (Zhang, 2008). Teachers need to decide on how to act in a classroom environment as teaching and learning take place (Akanmu et al., 2016). The lesson plans that teachers create operate as a mental screenplay or picture that directs their interactive teaching (Kabugi, 2013). A list of goals and objectives, a personal perspective on the nature of learning, and knowledge of the learners and their needs are a minimum of three components of planning for teaching Agricultural Sciences. Boikhutso (2010) stipulates that objectives, content, tasks for the day, evaluation, classroom discussion, instructional methods, error correction and feedback, questions, assignments, dealing with behaviour problems, teacher and learner roles, small group and pair work, large classes, one-to-one instruction, self-directed learning, mixed-level groups, motivation, anxiety, and attitude are more specifically the decision-making points in teaching of Agricultural Sciences. On the basis of the numerous categories of knowledge, skills, attitude, and awareness, teaching is seen as a decision-making process (Young & Edwards, 2011). Therefore, teachers are decision-makers who consider information before taking action in challenging situations. In addition to understanding the tricks of the trade, they must understand the motivations behind their actions.

This suggests that the interaction between a teacher and learners, working toward a shared objective, or resolving a dilemma throughout the teaching-learning process will have a significant impact on the success of an Agricultural Sciences lesson (Brown et al., 1991). According to a study by Reeves and Hedberg (2003), how often teachers used their lesson plans, they tended to deviate from them while teaching and made last minute adjustments to their lesson plans in the classroom during the teaching of Agricultural Sciences. Departing from the lesson plan when interactive decisions needed to be made during instruction occurs so that time may be spent more effectively (Olowa, 2012). Activities are modified to increase interest and are

elaborated for pedagogical reasons. An intentional decision to carry out a certain action is what Clark and Peterson (1986) characterise as an interactive decision. An interactive decision is a constant decision between acting the same way and doing differently. As was already said, plans made by teachers are not always carried out as planned. Kabugi (2013) discovered that, to obtain the desired results, teachers must choose what is best for them and which can assist to achieve the teaching and learning of Agricultural Sciences goals.

Agricultural Sciences lesson planning is emphasised in the South African National Curriculum Statement (NCS) and its modification to make sure that every teacher creates a framework that includes objectives or outcomes, material, assessment activities and procedures, resources, and time allocation (Manubay et al., 2002). As a result, the teacher gains an understanding of the material that must be finished in a certain amount of time in Agricultural Sciences (DBE, 2011). This may be viewed as an organised method of planning that forces a teacher to cover all the material, use the resources at hand, assess the learners, and employ diverse methods to accommodate the learners' range of skills (Darko et al., 2015). Agricultural Sciences teachers create a framework of plans for the structural and social aspects of the classroom, according to Clark and Elmore (1981), within which specific units and activities are scheduled for the academic year.

Hence, the Mitzel theory dealt with the teaching and learning process of Agricultural Sciences in the classroom. The Mitzel (1969) model, which emphasises that teaching involves interaction between the following variables: teachers and learners, their interactions, and the output of those interactions, served as the foundation for this study. Dunkin and Biddle (1974) modified the model to incorporate four variables: presage, context, process, and product. The presage variable, according to Clarke and Peterson (1986), comprises all teacher experiences that may have a formative effect (teacher background, personality, etc.), teacher preparation (teacher education training), and teachers' individual characteristics. The participating teachers studied Agricultural Sciences in high school and received training on Agricultural Sciences as part of a Bachelor of Education degree obtained in different instructions (Buruchara, Tukahirwa, Kashaija, Farrow, Wanjiku, Rao & Kuule, 2013).

The Mitzel theory emphasises that teaching comprises an interaction between many factors such as teachers and learners, their interactions and the output of those interactions will serve as the foundation for the researcher. Moradi et al., (2019) indicate that the modification of the model to incorporate four variables has been done and it included presage, context, process, and product. The Mitzel model was expanded by Dunkin and Biddle (1974) to incorporate four main variable types: presage, context, process, and product. A conceptual framework creates a structure or “concept” of the knowledge acquired in an Agricultural Sciences field of study (Akanmu et al., 2016). It is a model that hypothesises the relationships between the ideas being studied. Hoffman (2013) indicates that the importance of the claimed link is determined by testing the conceptual models created from the variables. Presage, context, process, and product factors were employed in this study. Using the experience of the Agricultural Sciences teachers during teaching and learning, the presage variable was essential in identifying classroom problems and obstacles (Nwike & Catherine, 2013).

The context of the classroom (context), the interaction between the teacher and the learners (process), and the consequences of the teaching (product) are likely to be influenced by the classroom teacher’s experience under the institutional variables. The climate, on the other hand, may have an impact on learners’ attitudes about Agricultural Sciences as subject, which in turn may have an impact on teaching and learning (Marais, 2016). The effectiveness of a teacher may be increased, which will raise the accomplishment of learners, through research on the difficulties and experiences associated with teaching and studying Agricultural Sciences (Darko et al., 2016). It is considered that by articulating and identifying the difficulties Agricultural Sciences teachers confront, they may use their extensive knowledge to reposition the vocational agriculture curriculum for design and execution of teacher training programmes and vocational education (Morris, 2019). Therefore, it was significant for these two theories to be combined so that each theory addresses a particular aspect. Mitzel’s theory focuses on teaching, while the theory by Clark and Peterson focuses on lesson planning. Therefore, it was relevant for these two theories to be combined for this study.

1.11 Organisational structure of the study

This study comprised five chapters, where each chapter addressed its own information separately from other chapters. Chapter one outlined the background of the researcher, research problem and the purpose of the research. It further highlighted research questions and significance of the research. The researcher's assumptions and the study's limitations were also stated in this chapter. Lastly, Chapter one explained the conceptual framework that underpinned the research. Chapter two provided a literature review, which had various subsections such as the significance of lesson planning in Agricultural Sciences, teaching and learning of Agricultural Sciences, lesson preparation for Agricultural Sciences, the effect of teaching and learning resources shortage on lesson planning as well as problems in lesson planning on Agricultural Sciences. Chapter two further outlined learning differences by learners in Agricultural Sciences as a subsection of the literature review. Chapter three provided a detailed research approach, research design and research population and sampling. Chapter three further outlined the data collection process, which included research instrument tools (semi-structured interviews, lesson observation, document analysis, and field notes), data analysis and quality criteria (credibility, transferability, confirmability and dependability). Chapter four outlined the results of the study and it further discussed the findings of the study. Lastly chapter five entailed the summary, conclusion, implication of the findings and the recommendation of the research.

1.12 Chapter Summary

The purpose of this study was to ascertain the experiences and difficulties faced by Agricultural Science teachers while preparing and teaching the theory and practice of Agricultural Sciences lessons. It sought to determine if teachers really prepare lessons, how their plans are constructed in relation to the guidelines for lesson preparation, and whether these plans are actually carried out as intended. It was assumed that if lesson plans include learning objectives and pertinent activities are created to meet them, a teacher will have some level of practical and theoretical understanding of Agricultural Sciences. The findings of this study are significant because they reveal the difficulties and experiences teachers encounter when planning Agricultural Sciences lessons. This may result in a change in how teachers view planning and how to incorporate it into their instruction. After all, if lesson planning entails creating a framework to direct a teacher's future actions, the time and effort spent during both the preparation and implementation phases will yield success in the

subject. The next chapter focused on the literature review where different types of literatures were reviewed in view of educators' experiences and challenges when planning and presenting theoretical and practical lessons in Agricultural Sciences. The literature review consists of subsections such as significance of lesson planning in Agricultural Sciences, teaching and learning of Agricultural Sciences, lesson preparation for Agricultural Sciences, the effect of teaching and learning resources shortage on lesson planning, problems in lesson planning on Agricultural Sciences and learning differences by learners in Agricultural Sciences. Chapter two further provides a detailed conceptual framework of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction of the chapter

The previous chapter focused on the background of the researcher, research problem, purpose of the study, research questions and the significance of the study. It further focused on the assumptions of the researcher, the study's limitations and the conceptual framework that underpinned the research. To comprehend the research theories and findings as discussed by other researchers who were interested in lesson plans and teaching challenges of Agricultural Sciences, this chapter reviews the literature on the difficulties and experiences faced by Agricultural Sciences teachers when planning and presenting theoretical and practical lessons. By describing the key results and pointing out knowledge gaps in the subject, the researcher concentrates on the challenges faced by teachers in lesson planning and teaching Agricultural Sciences. The chapter also outlines a developing nation's perspective on what has been accomplished, notably in South Africa; for instance, about the experiences and challenges faced by Agricultural Sciences teachers when preparing and presenting lessons. It elucidates how this study addressed the challenges faced by Agricultural Sciences teachers in planning and presenting theory and practical lessons, which have hitherto been either unknown or had less known about them. To understand how Agricultural Sciences teachers plan and carry out their lessons in the classroom for both theory and practice, which encompasses the preparation, enactment, and lesson analysis phases, this study drew on literature that focused on teacher planning (Buckingham & Saunders, 2004).

2.2 Significance of lesson planning in Agricultural Sciences

Planning is a psychological activity that involves seeing the future and thinking about objectives and strategies for reaching them (Clark & Dunn, 1991). According to Bonnen (2019), the methodical formulation of instructional requirements, arrangements, circumstances, resources, and activities, as well as testing and evaluation of teaching and learning of Agricultural Sciences, is referred to as lesson planning. It entails analysing the learning requirements and creating a delivery strategy to satisfy those requirements. Lesson planning is a pre-active decision-making process that occurs prior to the teaching of both theory and practical (Schon, 1983).

According to Clark and Dunn (1991), teachers make decisions that influence their own conduct and the behaviour of their learners, both consciously and subconsciously. Maryani, Martaningsih and Bhakti (2017) discovered that lesson planning is when teachers making deliberate attempts to create a cohesive system of activities that supports the development of learners' cognitive structures. Teachers' inventiveness and their capacity to integrate teaching and learning theories into their decisions and actions determine the calibre of such actions in Agricultural Sciences (Agbulu & Ademu, 2016).

According to Yildirim (2003), lesson plans should incorporate written tasks and a roadmap for future actions of the subject. Writing lesson plans compels teachers to carefully consider how to attain the aim to guarantee success for learners; thus, it is time well spent. Regardless of the result measure, teachers who plan are more effective than those who do not since an action plan at least shows a willingness to act (Buruchara et al., 2013). Additionally, written lesson plans offer a trail of proof that may be utilised to assess teachers' pedagogical mastery of topics in Agricultural Sciences (Hoffman, 2013). Furthermore, Lederman and Niess (2000) contend that the usefulness of Agricultural Sciences lesson planning is unaffected by the question of whether a written plan enhances a teacher's efficacy more than a plan committed to memory. Teachers' mental plans or pictures are more crucial for painting a picture of what is planned and what should happen in the classroom of Agricultural Sciences than their written lesson plans, which just provide a topic outline or a rough list of key topics (Modebelu & Nwakpadolu, 2013).

However, it appears that very few Agricultural Sciences teachers are making sufficient plans to obtain these advantages (Darko, Offei-Ansah, Shouqi & Jun-Ping, 2015). According to Shavelson and Stern (1981), the main factors that call for planning are dealing with the increasing instructional diversity in the classroom to achieve objectives, using effective teaching strategies to keep learners' attention, and a smooth transition between activities in supportive teaching and learning environments. Regardless of whether they write them down or not, teachers might consider the majority of these criteria in their lesson planning (Kabugi, 2013). According to the results of their study, Lovat and Smith (2003) found that teachers create plans to be implemented in the classroom for the following reasons: to feel more in charge, confident, and secure. Agricultural Sciences lesson plan takes a lot of time and work

since judgments are made on the order, structure, and organisation of the tasks and how much time should be spent on each of the activities of Agricultural Sciences (Buruchara et al., 2013). What takes place in the classroom is the end product of a dynamic and intricate network of interactions and linkages among preparations made outside the classroom, action taken inside the classroom, and reflection during and after activities in Agricultural Sciences (Modisenyane, Rollnick, & Huddle, 2004). Additionally, it shows that the lesson planning and implementation phases in Agricultural Sciences cannot be separated.

According to Williams and Dollisso (2018), diverging opinions on whether lesson plans should be written or mentally stored have been shown through research on teacher planning. A number of South African studies cast doubt on whether South African teachers are sufficiently prepared, particularly in a way that would be able to meet the principles of written lesson plans of Agricultural Sciences (Nwike & Catherine, 2013). There are worries that numerous teachers' planning may be insufficient, which may prevent some teachers from meeting planning requirements such as designing lessons around outcomes, using learner-centred and activity-based approaches that involve the development of skills, and including continuous assessment that supports the learning process (Wang & Knobloch, 2018). According to Bage (1999), plans should be written down because they simply reflect a teacher's mental planning, provide structure and direction for the lessons taught, align assessment with lesson outcomes, maintain a positive balance between teaching and learning, and are helpful for future planning.

According to Ornstein (1997), there is no one perfect framework for a lesson plan. The benefits of preparing a lesson plan, according to Wells, Hainline and Smalley (2019) include allowing the teacher an opportunity to decide the class' objectives, arranging the sorts of activities that would satisfy these objectives, producing learning material, and determining the time allotment for a lesson. A lesson plan aids a teacher by providing a framework for instruction and guiding the implementation of standard-based education (Kidane & Worth, 2012). Furthermore, a lesson plan creates a framework for Agricultural Sciences teachers to follow in terms of what has been taught and what needs to be taught. Agricultural Sciences lesson plans assist teachers in feeling at ease with instructional preparation by providing them with a sense of understanding and responsibility (Joly, Colinet, Gaunand, Lemarié & Matt, 2016). A

lesson plan also creates a feeling of purpose and concentration on the subject matter and thus assists Agricultural Sciences to be prolific in the teaching and learning process (Swan & Burkhardt, 2014).

2.2 Teaching and learning of Agricultural Sciences

Darko, YuanSimmons, Abbey, Liu and Kumi (2016) stipulate that the activities that really occur inside and outside of a school's classrooms are examined by the process variable and are known as teaching and learning. They consist of teachers' and learners' discernible behaviours. As is frequently believed, a teacher's actions in the classroom have an impact on how and what learners learn about Agricultural Science lessons, for instance (Emiliasari, 2019). Either a teacher or learner-centred learning strategies are used in an Agricultural Sciences classroom. This includes all clearly visible interactions between teachers and learners in the classroom, such as how they instruct, how the learners react, etc. (Buruchara et al., 2013). Teacher-centred and learner-centred teaching approaches are fundamental to most theoretical and instructional premises for Agricultural Sciences, according to a survey of pedagogy and classroom procedures (Hoffman, 2013). The outcome of this last stage is heavily influenced by the type of the Agricultural Sciences teacher's teaching and the learner's learning. Yildirim (2003) advocates that the changes that may be seen in learners as a result of their participation in classroom activities with their teachers and other learners constitute this phenomenon (Williams & Dollisso, 2018).

While a learner-centred teaching approach adopts a more progressive approach that encourages maximum learners' engagement, a teacher-centred teaching approach tends to be more traditional where a teacher leads an Agricultural Sciences class most of the time (Buruchara et al., 2013). Both teaching and learning tactics and resources are used in the teaching and learning of Agricultural Sciences (Bonnen, 2019). Waithera (2013) proffers that an essential institutional component influencing the teaching and learning of Agricultural Sciences in secondary schools is the teaching and learning process. In contrast to other subjects, Agricultural Sciences is unique in that it cannot be learnt exclusively in a classroom or on the field. To allow many aspects of agriculture and rural development to be appreciated in their real context, more formal learning should ideally be combined with practical teaching and learning, such as traditional apprenticeship learning (Maryani, Martaningsih & Bhakti, 2017).

Traditionally, teaching and learning techniques have been referred to as teaching and learning methods (Kabugi, 2013). The focus placed on particular techniques in teaching and learning today determines the approach that should be adopted for Agricultural Sciences (Marais, 2016). These strategies include the facilitative approach, the experience approach, the transmission strategy, the collaborative approach, and the interactive approach which can be used by Agricultural Sciences teachers during the teaching and learning process (Akanmu et al., 2016). When using an interactive technique, there is an idea exchange between the teacher and the learners, or between the learners themselves as in group work of Agricultural Sciences (Buckingham & Saunders, 2004). Learners investigate their life experiences as a basis for developing new information, abilities, and making judgments while using an experiential approach. A learner's experiences in the community form the basis of their learning. In a facilitative method, the teacher offers chances for learners to learn as well as the stimulation for their engagement with new information. A teacher only acts as a facilitator and manager of learning of Agricultural Sciences. The Agricultural Sciences teacher chooses the approach to utilise based on the aforementioned methods and the material being taught to learners.

Lectures, demonstrations, discussions, educational excursions, projects, question and answer sessions, homework assignments, and practical tasks are the most popular teaching methods for Agricultural Sciences (Swan & Burkhardt, 2014). When using a lecture as a teaching method in teaching Agricultural Sciences, the teacher must transmit knowledge to the learners. When explaining something to learners, the teacher reads the notes to them so that learners can apply scientific knowledge and analyse the given information by a teacher. The primary learner's activities in this technique are listening and taking notes (Modebelu & Nwakpadolu, 2013). A process or action can be effectively explained or described by demonstration. Before instructing learners in a particular task, a teacher models it for them. One of the learners may also be used by the teacher to model the exercise. Discussion is a type of interaction that incorporates the engagement of the learners by talking or writing and promotes an open discussion of the benefits and drawbacks of a procedure or thing. In addition to giving learners a chance to see new locations, educational trips provide them the chance to have thrilling experiences that would not be possible in a typical classroom setting (Bonnen, 2019).

This makes learning more enjoyable and allows learners to explore new environments. However, some teachers feel that field excursions are not well planned and arranged. The importance of agricultural education in providing learners with the information and abilities they need to succeed in the agricultural industry cannot be overstated (Emiliasari, 2019). When it comes to planning and delivering classes that combine theory and practice, teachers in this subject encounter particular difficulties. This literature study investigated and analysed the difficulties experienced by teachers in the field of Agricultural Sciences, illuminating these difficulties and offering suggestions for potential remedies. The term ‘teaching’ covers the concepts of fostering a desire to learn, being committed to passing information to others, being aware of your learners' needs, and assisting them in meeting them (Smeds, Jeronen & Kurppa, 2015).

A successful Agricultural Sciences teacher teaches well while drawing on his professional expertise (Campbell & Evans, 2000). This implies that the Agricultural Sciences teacher must be well-versed in both theoretical and practical elements of agriculture, as well as be able to deliver information, offer directions, and organise resources for learners to use during the learning process (Yopp et al., 2016). Akanmu et al., (2016) stipulated that Agricultural Sciences must be taught as a pre-vocational subject in primary and junior secondary schools, and as a vocational subject in high school, according to the new proposed system.

2.4 Lesson preparation for Agricultural Sciences

Joly et al., (2016) argue that lesson planning is the mental activity of imagining what will occur in the classroom during a lesson. This includes taking into account a variety of components of the Agricultural Sciences classroom, ranging from approaches to interest learners in the content to the many ways learners may react (Mbokazi & Lebeloane, 2022). Thus, whether purposefully or intuitively, preparing for instruction is a vital step that all effective teachers perform, and meaningful preparation is difficult (Myers, Dyer & Washburn, 2014). Although Agricultural Sciences planning may look straightforward, going through the motions of day-to-day planning does not guarantee that relevant activities will be realised (Morris, 2019). The purpose of Agricultural Sciences planning is to assure learners’ learning; hence, planning assists in the creation, arrangement, and organisation of instructional events to enable that learning

to occur (Wells et al. 2019). According to Yildirim (2003), generic lesson planning for Agricultural Sciences for each class, start by establishing specific, quantifiable learning objectives. These goals, which outline what learners should know or be able to do by the conclusion of the class, should be in line with the curriculum (Nwike & Catherine, 2013).

For instance, a goal can be used to illustrate appropriate livestock management techniques or to comprehend the mechanism of photosynthesis in plants (Buruchara et al., 2013). Before beginning a new class, a teacher should determine the past information and abilities that learners should have. This enables teachers to assess the lesson's beginning point and see any areas that still require clarification (Boikhutso, 2010). Brief pre-assessments and a review of required ideas can help to adjust the lesson to the requirements of the learners (Hoffman, 2013). Agricultural Sciences can be taught through a number of approaches, such as lectures, discussions, hands-on activities, field trips, demonstrations, and multimedia presentations (Kabugi, 2013). Agricultural Sciences teachers need to select correct teaching and learning strategies which will create effective engagement in the classroom and assist in achieving lesson objectives (Buruchara et al., 2013). Using a variety of instructional techniques helps accommodate various learning preferences and increase student engagement (Emiliasari, 2019). Gather and arrange materials and resources that are pertinent to the lesson's objectives. Textbooks, internet articles, research papers, movies, pictures, diagrams, and agricultural implements or samples might all fall under this category (Modebelu & Nwakpadolu, 2013).

Modisenyane et al., (2004) stipulate that teachers should make sure the resources are precise, current, and suitable for the intended age range and educational level. They should create activities that promote comprehension and active engagement. Hands-on tasks in Agricultural Sciences such as soil testing, plant propagation, or animal husbandry may be very helpful. To encourage critical thinking and problem-solving abilities, consider about including group work, case studies, role plays, or discussions (Darko et al., 2016). They should put the lessons in a logical order that makes sense during teaching and learning of Agricultural Sciences (Akanmu et al., 2016). There is also a need for a structured information presentation that builds on prior ideas and links them to new ones. Teachers must provide chances for learners' participation and questions throughout the session by breaking down complicated concepts into

smaller, more digestible pieces (Lederman & Niess, 2000). They must recognise that learners have a range of learning requirements and skills. They must provide additional assistance or challenges during education according to the needs of the individual or group. Teachers must be able to accommodate learners with diverse learning styles, skills, or backgrounds, offer supplemental materials, offer scaffolding, or change the activities (Wells, Hainline & Smalley, 2019).

Teachers must consider the lesson's efficacy after teaching it. They must examine if the learning objectives were attained, note any difficulties or gaps, and collect learners' comments (Babu, Huang, Venkatesh & Zhang, 2015). They must then utilise this knowledge to modify next classes and enhance the teaching and learning experience. They must do this keeping in mind that planning Agricultural Sciences lessons should be an active process that allows for flexibility and customisation based on the requirements and input of learners (De Arment et al., 2016). They may design worthwhile learning experiences in Agricultural Sciences by utilising a number of instructional tactics and interesting activities. The creation of objectives is the first step in the lesson planning of Agricultural Sciences content (Campbell & Evans, 2000). Kabugi (2013) state that teachers should be knowledgeable about the requirements for objectives and should be appropriate for the subject matter, which also dictates the type of resources to be utilised in the plan's implementation of teaching and learning. The performance of learners who are taught utilising instructional materials is superior to that of those who were not (Waithera, 2013). The efficacy of the teaching-learning process for Agricultural Sciences will increase as a consequence of exposing learners to the usage of instructional resources (Wang & Knobloch, 2018).

A taxonomy of objectives should be used to guide and remind beginning and experienced teachers to avoid focusing too much on just one level, such as the straightforward recall of factual knowledge (Zhang, 2008). There is a need to define a time limit for the completion and attainment of certain learning objectives since instructional objectives in Agricultural Sciences may also refer to the amount of time needed to complete a learning task (Swan & Burkhardt, 2014). The aim should be connected to a lesson's subject matter, fit the practice task, and be compatible with the evaluation and assessment. A test or assessment can help with memory retention and recall of material for Agricultural Sciences (Kabugi, 2013). Agricultural Sciences teachers do not use the evaluation or assessment methods specified in their plan.

After class, there is a formative evaluation that is generally successful but is weak in practice and poorly understood by teachers. One may argue that a teacher's job is to facilitate learning rather than to really educate. The numerous choices a teacher must make to get learners ready for the learning experience show how important lesson planning is. Teachers intentionally work to create a system of activities that supports the growth of learners' cognitive structures as part of lesson planning (Akanmu et al., 2016). When it comes to instructional orientation, which is concerned with the kind of material presented and how it is delivered, teachers who plan their lessons thrive (Bonnen, 2019). The cognitive process of imagining what will transpire in the classroom during an Agricultural Sciences session is known as lesson planning.

2.5 The effect of teaching and learning resources shortage on lesson planning

One of the major issues facing South African schools is the unavailability of teaching and learning materials. This problem frequently makes lesson planning and classroom teaching less effective. This is especially obvious in vocational disciplines such as Agricultural Sciences where it is crucial to teach learners how to use their physical abilities. According to the Curriculum and Assessment Policy Statement (CAPS), Agricultural Science laboratories and texts must be made available to schools before they offer the subject. This is meant to prepare learners for both farming and higher education studies. Due to the lack of suitable teaching and learning materials in schools, this possibility appears unachievable. This also affects how teachers prepare and deliver the lessons during the teaching and learning of Agricultural Sciences. All tools and supplies used to facilitate the effective study of Agricultural Sciences are referred to as teaching and learning resources (Hainline & Smalley, 2019). For effective teaching and learning, a teacher chooses, creates, and acknowledges teaching and learning materials (Buruchara et al., 2013).

Zhang (2008) discovered that the most significant teaching-learning resource is a teacher. Given their importance to the success of teaching and learning in the classroom, having adequate facilities, equipment, and resources should not be minimised when developing the curriculum. The importance of teaching and learning materials for the effective delivery of Agricultural Sciences in schools has been emphasised by a number of writers. Hoffman (2013) stipulates that how a teacher employs teaching tools to advance the learning of learners is influenced by their

training and experience in a classroom. This brings up the idea that learning on how to improvise in schools with limited resources should be part of teacher training programmes (Hainline & Smalley, 2019). Furthermore, if Agricultural Sciences teachers receive in-service training, it may be possible to use the few resources at hand to solve the issue that schools are now facing. Teachers commonly use the lecture approach because of a lack of resources. This approach cannot help learners develop an understanding of Agricultural Sciences. Learners can quickly comprehend crucial scientific topics, thanks to relevant teaching (Yildirim, 2003).

Darko et al., (2016) advocate that a teacher can promote active learning in the classroom by using teaching and learning materials. As a result, learners feel inspired and ready to learn as well as to participate in classroom. According to Darko et al., (2015), lack of school farms and laboratories results in Agricultural Sciences classes that are impractical and boring to learners. The teaching of the topic is hampered by a shortage of crucial teaching resources in Agricultural Sciences, such as demonstration plots, laboratories, school farms, and animal farms (Young & Edwards, 2011). This circumstance hinders the capacity of learners to meet learning objectives and has a significant impact on their behaviour in class on a daily basis and attitudes toward the subject (Boikhutso, 2010). Due to teachers' sole access to textbooks and syllabi for instruction, learning outcomes will continue to be impacted. Waithera (2013) says that a lesson and teaching plan eliminates some of the challenges experienced during teaching and learning activities. The availability of resources for teaching and learning, or lack thereof, will either help or hinder curriculum implementation (Kabugi, 2013). Thus, facilities, equipment, and materials have an impact on how secondary school Agricultural Sciences is taught.

Teachers no longer have to rely entirely on words to convey their thoughts, thanks to advancements in contemporary technology (Erickson, 1986). There are several resources available that may be employed to increase the vividness and intrigue of the meaning. These items serve as resources for instruction and learning. Furthermore, these materials, by virtue of their raw presentation, provide a dynamic alternative to traditional textbooks (Modebelu & Nwakpadolu, 2013). The latter summarises, explains, interprets, and hence subtly organises perception and comprehension, assisting a learner in attaining an efficient use of teaching and learning materials. A lack of these beneficial materials will make teaching and learning

more difficult (Bonnen, 2019). According to Nwike and Catherine (2013, in terms of teaching and learning, materials for teaching and learning are crucial. The researchers further highlight that effective Agricultural Sciences teachers keep in mind what they teach while they are instructing. As a result, using teaching tools such as audio-visuals helps learners understand these complex concepts more clearly in Agricultural Sciences (Nwike & Catherine, 2013).

Babu et al., (2015) stipulate that in a real-world setting, learners learn more effectively when they are having various ways to demonstrate and support the theory through practice. Learners get a hands-on experience in an actual learning setting. Because it helps them comprehend the fundamental ideas in the topic, a genuine learning environment makes it much easier for learners to relate to the information (De Arment et al., 2016). The use of farm equipment and livestock tools is part of the Agricultural Sciences curriculum in schools (Wang & Knobloch, 2018). The primary drawback, however, is that schools may only offer a tiny portion of agricultural resources, such as agricultural charts, seeds, poultry, and other modest, basic farm equipment. The issue is exacerbated by the way budget is allocated in schools. Masha and Maphuta (2022) argue that the lack of major teaching resources in Agricultural Sciences such as demonstration plots, laboratories, school farms, and animal farms impedes topic instruction. This sort of circumstance impedes the accomplishment of learning outcomes and has a significant impact on learners' academic performance (DBE, 2020).

Because teachers' teaching tools are confined to textbooks and curricula, learners' performance will continue to suffer. As a result, some learning activities are dropped from the teaching plan (Owoeye & Olatunde Yara, 2017). An insufficient availability of teaching and learning materials in schools jeopardises the quality of education that learners acquire. The quality of the education learners acquire is compromised by a lack of suitable teaching and learning materials in most of South African schools. Modisenyane et al., (2004) discovered that Agricultural Sciences is one subject that may help learners become independent people in life and in the future. The topic should thus be taught as a job-related subject. Bonnen (2019) advocates that the shortage of classroom space also makes it difficult to teach Agricultural Sciences. Some schools have resources for teaching and learning, but they are unable to use them because there is not enough agricultural land for them to use the resources on

(Swan & Burkhardt, 2014). Learning aids are crucial in assisting learners comprehend the dynamics of a subject (Bonnen, 2019). Some processes are hard to comprehend when described in general terms (Thom, 2020).

2.6 Problems in lesson planning on Agricultural Sciences

The purpose of the lesson does not explain what the learners will accomplish, which is one of the most common mistakes that teachers make when writing lesson plans (Rao, 2012). A goal is a description of what a learner does that serves as the foundation for drawing an inference or drawing a judgment about learning Agricultural Sciences. Abdulhamid (2015) indicates that poorly worded objectives result in incorrect inferences during lesson presentations. A lesson plan assessment is a statement of how an instructor examines pupils and determines if the objectives have been met (Maryani et al., 2017). The resources listed in the lesson plan are unrelated to the learning activities described (Myers et al. 2014). According to Hainline and Smalley (2019), Agricultural Sciences researchers frequently call for access to specialised facilities such as laboratories, farms, or machinery.

However, not all academic institutions have the resources or the infrastructure required to offer these materials (Waithera, 2013). Implementing practical and hands-on activities, which are necessary for efficient teaching and learning in this topic, may be hampered as a result (Buruchara et al., 2013). Technology and techniques are continually developing in the realm of agriculture. It can be difficult for teachers to stay on top of new advancements and incorporate them into lesson preparations (Darko et al., 2015). Yildirim (2003) indicates that staying current with trends and advances involves ongoing professional growth and study. Sometimes, teachers do not have enough time to present a wide range of Agricultural Sciences topics (Boikhutso, 2010). This could lead to a hurried curriculum and not enough time for in-depth talks or hands-on exercises (Marais, 2016). Teachers must prioritise the vital ideas and abilities while making sure that all learners have a thorough comprehension of the topic (Modebelu & Nwakpadolu, 2013). Buruchara et al., (2013) indicate that numerous sophisticated ideas, including genetics, crop rotation, soil management, and pest control, are involved in the Agricultural Sciences. It might be difficult to explain these ideas in a way that is clear and intelligible to learners with various backgrounds and learning preferences (Campbell & Evans, 2000).

To promote understanding, teachers must employ a variety of teaching techniques, visual aids, and hands-on activities. Campbell and Evans (2000) stipulate that biology, chemistry, economics, and environmental science are just a few of the fields that are frequently incorporated with Agricultural Sciences. According to Wang and Knobloch (2018), it might be difficult to include all of these distinct ideas into lesson plans and guarantee a complete grasp. This problem may be solved by interdisciplinary linkages and collaboration with teachers from other fields (Thom, 2020). Practical experiences are the greatest way to study Agricultural Sciences. Learners might not always have access to real-world agricultural operations or field trips, though, due to a variety of limitations (Babu et al., 2015). Despite obstacles, finding workarounds such as virtual simulations, guest lecturers, or collaborations with nearby farms or agricultural groups may give learners actual experiences. Effectively evaluating learners' learning in Agricultural Sciences may be difficult (Boikhutso, 2010). It is possible that traditional written exams do not fully reflect the variety of abilities and knowledge needed in this sector (Hatch, 2002). It is possible to test a learner's comprehension and application of concepts more effectively by including alternative assessment techniques such project-based examinations, presentations, and hands-on activities (Bonnen, 2019).

2.7 Learning differences among learners in Agricultural Sciences

According to Thom (2020), highly successful teachers take into account learning variations in their planning, building on the planning of instructional techniques. All learners in a classroom should have their needs met by the diversity of instructional tactics that a teacher plans to use during the teaching and learning process of Agricultural Sciences. Every learner in a classroom is a unique individual for the subject. Each learner enters the classroom with a unique set of experiences, skills, and attitudes (Zhang, 2008). Therefore, assuming that everyone learns in the same way is fallacious. To ensure that each learner learns Agricultural Sciences content in a way that is relevant to them, q teacher must take into consideration these variations in preparation. This is not an easy assignment, and teachers must have some knowledge of personality types and how to interact with each one (Hoffman, 2013). Campbell and Evans (2000) indicate that to properly modify education, teachers must be cognisant of both their own personality traits and attributes as well as those of their learners. The professional focus of teaching is undermined by evaluations of teachers based purely on their academic performance (Young & Edwards, 2011).

While having this information is crucial, teachers also need to be able to link academic ideas, establish relationships with their learners, and adapt their knowledge to fit the requirements of the learners they teach (Boikhutso, 2010). Highly successful teachers modify their pedagogy to meet the demands of an Agricultural Sciences class. When teaching distinct groups of Agricultural Sciences learners, competent teachers adapt their lessons and lesson planning (Swan & Burkhardt, 2014). Planning to educate learners one-on-one or in groups is one method Agricultural Sciences teachers may use to accommodate the demands of a wide range of learners (Bonnen, 2019). The neediest learners receive personalised teaching and revision from highly successful teachers (Yildirim, 2003). When learners do not understand the content the first time, highly effective teachers re-teach using different tactics (Modisenyane et al., 2004). Individualising education was viewed by 67% of teachers as one of the key traits of a successful educator. Effective Agricultural Sciences teachers employ simple language during teaching and learning, provide extra examples or explanations when necessary, and draw attention to crucial concepts. These illustrations of successful instruction highlight how crucial organisation is (Waithera, 2013). In the classroom, individualising the teaching and learning of Agricultural Sciences was more common among teachers who are more structured. This specialised training may make a big impact on learners' academic progress.

The order of mind during planning is another facet of teacher organisation that affects learning disparities (Modebelu & Nwakpadolu, 2013). In a study, which outlines the six top lesson planning mistakes made by new teachers, it was discovered that new teachers either failed to establish an assessment or had one completed by learners outside of class, which prevented them from differentiating learning (Darko et al., 2016). The requirement for precise lesson and learning objectives as well as logically designed lessons that are suitably aligned is reiterated in this crucial part of lesson planning. Small-group or one-on-one education can be adjusted by teachers. Planning for assessments affects a teacher's capacity to effectively differentiate instruction. It is crucial to remember that these learning preferences are not mutually exclusive and that people may display a mix of them. According to Zhang (2008), the idea of different learning styles may also be more complicated than previously believed, according to new research, with some studies suggesting that individualised techniques catered to a person's needs and skills may be more successful.

One may improve their study techniques and get the most out of their educational experiences by being aware of their preferred learning style. To improve general comprehension and retention, it is also advantageous to research and use different learning strategies (Campbell & Evans, 2000). Everybody has distinct learning preferences, thus it is important to alter teaching strategies in educational environments to account for these variations. According to Modebelu and Nwakpadolu (2013), Autism, ADHD, dyslexia, and other learning difficulties are among the many inherent differences in the human brain that are recognised and valued by neurodiversity. When it comes to learning, people with neurodiversity may have distinct strengths and weaknesses; so, it is crucial to offer help and accommodations that are tailored to their particular requirements. Different cognitive processes that people have an impact on how they gather and process information. Others may be better at creative thinking or spatial awareness, while some may be better at logical reasoning and problem-solving (Boikhutso, 2010). To enhance learning results, teachers might adapt their teaching strategies by being aware of these cognitive distinctions. Individuals differ in their capacity for concentration and attention span in the teaching and learning process.

While some learners can find it difficult to focus for long amounts of time, others could need frequent breaks or other engagement techniques. Different attention types can be accommodated by offering a range of activities, involving movement, and employing multi-sensory methods as everybody has a different capacity for memory (Kidane & Worth, 2012). While others may exhibit the reverse trend, some may have strong short-term memory but suffer with long-term retention. Learners with various memory capabilities can be assisted by using mnemonic devices, repetition, visual aids, and other memory-enhancing approaches (Modisenyane et al., 2004). There can be wide variations in how quickly different people digest information and react to it (Abdulhamid, 2015). While certain learners might need more time to fully evaluate and understand topics, others might pick up on material more quickly (Marais, 2016). Various processing rates can be accommodated by offering flexible time restrictions, giving more information, or employing various teaching strategies. Learning experiences may be impacted by sensory preferences. Some people may be more sensitive than others to sensory stimulation, such as light or noise, which might impair their ability to focus (Wang & Knobloch, 2018).

A more inclusive learning environment may be created by giving alternatives or adjustments, taking into account each individual's sensory demands, and providing a comfortable learning atmosphere (Babu et al., 2015). Additionally, learners' social and emotional requirements vary, and this might have an effect on how well they interact with course content. While some learners might do best in group situations, others might prefer working alone (Buruchara et al., 2013). For all learners, a healthy learning environment may be cultivated by recognising and addressing social and emotional elements (Yopp et al., 2016). By using a variety of teaching techniques, offering tailored assistance, and encouraging inclusive behaviours, Agricultural Sciences teachers may accept and accommodate learning differences (Abdulhamid, 2015). They can create an environment that promotes the achievement and wellbeing of all learners by acknowledging and respecting these differences in an Agricultural Sciences classroom (Campbell & Evans, 2000).

2.8 Conceptual framework of the study

This study was guided by Mitzel's (1969) theory and a theory developed by Clark and Peterson (1986). Mitzel's (1969) theory sheds light on instructional strategies used in the teaching and learning of vocational Agricultural Sciences in the FET. Teaching must take into consideration two factors, according to Mitzel (1969), namely: the interactions between the teacher and the learners, and the results of such interactions during the teaching and learning of Agricultural Sciences. This is a very suitable model to provide for the teaching of the subject, especially for a study that explored teachers' experiences while preparing and presenting Agricultural Sciences theoretical and practical lessons in the Lebopo Circuit, Limpopo, South Africa. Studies such as those by Ikeoji, Awukubike and Disi (2007), Msigala (2010), Moriba and Edwards (2013), Waithira (2013), and King'aru (2014) utilised this approach. Dunkin and Biddle (1974) developed the approach and summarised it into four thematic categories: presage, context, process, and product factors. A teacher's personality, readiness, general features, background, abilities, and deficiencies can all be included in the presage thematic area in the process of teaching of vocational Agricultural Sciences (Smith et al., 2004). While the process thematic area focuses on the interaction or relationships between the teacher and the learners, the context thematic area covers the qualities of the learners and the learning environment (Msigala, 2010).

According to Ikeoji et al. (2007), the impacts of training are related to the product theme area. The presage thematic area, which is supported by a teacher's experiences, has a tendency to influence the classroom environment (i.e., the context), the interaction between the teacher and the learners (i.e., the process), and the results of the instruction (i.e., the product). Mitzel's model acknowledges this area as being fundamental to understanding classroom problems and challenges. The qualities of Agricultural Sciences teachers, which may have an impact on the teaching process, are addressed by presage factors, including teachers' formative and training experiences and teachers' traits (Dunkin & Biddle, 1974). King'aru (2014) stipulates that context factors deal with the circumstances in which teachers must adapt, as well as the aspects of the surrounding environment over which teachers, school administrators, and teachers have very limited control (Waithira, 2013). The process of teaching and learning between teachers and learners takes place in a form of process variables, product variables concentrate on the results of teaching, particularly the adjustments that take place in the learners (Msigala, 2010).

This study, which intended to investigate the experiences and challenges faced by Agricultural Sciences teachers when preparing and presenting theory and practical lessons, was supported by the idea of presage variables as proposed by Mitzel's model. Therefore, it was important to discover the factors influencing the teaching and learning of vocational Agricultural Sciences for both theory and practice. Therefore, it was thought that recommendations might be made to enhance the teaching and learning processes related to this subject by better understanding these factors and their interconnections for better lesson planning and the teaching of Agricultural Sciences. This assumption was made in light of research by Ikeoji et al. (2007), Msigala (2010), Waithira (2013), and King'aru (2014), all of which suggest that Mitzel's model recognises presage variables as fundamental in comprehending classroom issues and challenges that are influenced by teachers' experiences when teaching Agricultural Sciences. Accordingly, the classroom teachers' experiences typically have an impact on the context (the setting of the classroom), the process (how the teacher and learners interact), and the results (the outcome) of the education.

Given the fact that the CAPS policy document has defined methods of planning and even templates or forms for planning, which may be restrictive, it is uncertain to what degree teachers adjust their plans (DBE, 2020). This study also investigated lesson

preparation in CAPS documents and how it is used in the classroom by Agricultural Sciences teachers. According to Clark and Peterson (1986), opportunities and limitations in a situation have an impact on how teachers think and act during lesson planning. Lesson preparation includes a teacher's pre- and post-teaching cognitive processes, as well as their decisions and interactions with a class during the teaching and learning process. Many FET subjects, including Agricultural Sciences, are included in the South African National Curriculum Statement (NCS), which uses a CAPS teaching strategy, which indicates that vocational subjects must have practical lessons. It also says that learners need to be active in knowledge construction during teaching and learning (DBE, 2021). To explain lesson planning as a fundamental psychological process that enables the individual teacher to visualise the future and create a framework to direct his or her prospective activities, Clark and Peterson (1986) established an analytical framework.

DBE (2021) asserts that teachers are expected to begin by identifying the necessary learning outcomes and assessment standards, followed by the selection of the content and learning activities that will lead to the achievement of the outcomes as specified by the CAPS document. It can be argued that their own practical and theoretical knowledge is the primary factor that determines how they would adapt their curriculum planning processes. According to the South African CAPS, lesson preparation should start with the outcomes identified first, followed by the identification of content-based activities that would address the chosen outcomes and guarantee their accomplishment (DBE, 2020). In other words, results might be thought of as goals or aims. The idea of teacher planning is described in the literature as a cognitive process in which teachers decide how they will behave to achieve particular results for Agricultural Sciences. Research also identifies two approaches that teachers might use to instructional planning: either they choose outcomes or objectives first, or they can think about material, goals, and knowledge all at once.

Ikeoji et all., (2007) reported that planning may be thought of as a hierarchically ordered series of cognitive and behavioural processes geared towards a certain objective of the subject. Another planning model that has been proffered by Msigala (2010) contends that teachers plan according to an implicit set of mental scripts or activity outlines for carrying out interactive lessons. Teachers rarely need to go into detail when planning since learners have mastered these mental scripts. Teachers

therefore, focus on creating a timetable during planning, concentrating on the order of objectives, material, and activities. Teachers mentally practice lesson plans to foresee issues or to develop their initial ideas (Devers & Frankel, 2000). While planning, they may occasionally take the rational model's stages into account, but they never start with the end in mind. They choose the activities they think will hold learners' interest from easily accessible materials such as curriculum guides or teachers' editions of textbooks.

The researcher employed two theories, one by Mitzel (1969) and another theory created by Clark and Peterson (1986) to guide the research process. Qualitative research entails examining and comprehending complicated phenomena. Through the development of qualitative data collecting tools, the researcher created interview guides, non-participant observations of Agricultural Sciences classes, field notes, and document analysis of lesson plans based on the two theories selected for this study. The questions gave the participants the opportunity to voice their experiences and viewpoints about the planning and delivery of Agricultural Sciences classes while also exploring various facets of the two theories. When gathering data for the study, the researcher firstly used pilot instruments to make sure they successfully capture the necessary information for the researcher. Based on the outcomes of the pilot study, the interview questions were improved for clarity and relevancy. Agricultural Sciences teachers were interviewed through in-depth open-ended questions.

The construction of these questions was guided by theoretical notions to make sure they probed the pertinent aspects of the theories. The two theories have influenced what has been seen and the context in which observations have occurred during Agricultural Sciences lesson using the non-participation lesson observational approach. The investigation has constructed a coding scheme based on the two theoretical models. Key theoretical notions were represented by codes. This approach aided in the theory-based categorisation of information discovered in documents. To find occurrences that matched the codes, the researcher methodically looked through the materials (Dyer & Osborne, 2012) This narrow emphasis makes sure that data gathering is theory-driven. The researcher provided an overview of the data classified for each category and further related the theories to these summaries. The texts, which either supported or contradicted the theoretical ideas, were discussed. The researcher compares the theoretical topics in various documents, and found patterns,

discrepancies, or inconsistencies in the data while maintaining the selected theories as standards.

The two theories were concentrated on the use of systematic coding techniques for data analysis. Codes were derived directly from the researcher's theoretical foundations. Initial codes were developed from the data by the application of two theories developed by Clark and Peterson (1986) and Mitzel (1969). However, they were later connected back to the theories for a deeper examination. The obtained data included themes that could be found by using thematic analysis. Themes were based on theoretical conceptions. In the research, trends and differences were clarified by comparing the participants' replies to theoretical notions. This was done to continually compare the new discoveries with the theoretical frameworks. This iterative procedure aided in the revision of the codes and themes to make sure they matched the theories selected for this study. Qualitative researchers may offer a deep, contextually grounded knowledge of the phenomena under inquiry by incorporating a theoretical framework throughout the research process. This method not only deepens the researcher, but also advances the field's larger theoretical conversation.

Since the researcher was guided by the Mitzel (1969) theory, and the theory developed by Clark and Peterson (1986), these two theories were combined for this study. Clark and Peterson's (1986) theory focused on teachers' lesson planning for Agricultural Sciences. According to the theory, lesson planning is a fundamental psychological activity that enables teachers to see the future and build a framework to guide their future activities. This framework was utilised in this study to evaluate and explain the decision-making process that teachers engage in while designing Agricultural Sciences lessons, to execute this plan in the classroom throughout the teaching and learning process (Doyle & Holm, 1998). The Mitzel theory dealt with the teaching and learning process in the classroom. The Mitzel theory emphasises that teaching comprises an interaction between numerous factors such as teachers and learners, their interactions and the output of those interactions will serve as the foundation for the researcher. Moradi et al., (2019) indicate that a modification of the model to incorporate four variables has been done and includes presage, context, process, and product. Therefore, it was significant for these two theories to be combined so that each theories could address the particular aspects vital for the researcher, which were lesson planning and the teaching of Agricultural Sciences.

2.9 Summary of the chapter

The researcher aimed at providing more insight about the challenges and experiences faced by Agricultural Sciences teachers when preparing and presenting theoretical and practical lessons. In this regard, broad literature about lesson plan challenges was reviewed, particularly in terms of what challenges they face in preparing and presenting the lessons. A majority of the studies reviewed focused on the following issues: choices regarding lesson activities; planning components such as objectives, content, assessment activities, or tasks; teachers' reliance on published materials; teachers' personal and professional experiences; written versus committed-to-memory plans; learner involvement; and accessibility of teaching and learning resources. According to this literature review, very little is known about the difficulties and experiences that Agricultural Sciences teachers confront while planning and delivering theory and practical lessons. The next chapter focused on the research methodology, which covers aspects such as research approach, research design, research population and sampling, data collection, data analysis and quality criteria and ethical consideration (permission to carry out a study, confidentiality and privacy, benefits and harm, respect, dignity, and standard core as well as informed consent and voluntary participation).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction of the chapter

The previous chapter was based on the literature reviewed, which had the following subsections: Significance of lesson planning in Agricultural Sciences, teaching and learning of Agricultural Sciences, lesson preparation for Agricultural Sciences, the effect of teaching and learning resources shortage on lesson planning, problems in lesson planning on Agricultural Sciences and learning differences by learners in Agricultural Sciences. Chapter two further provided a detailed discussion of the conceptual framework of the study. This chapter entails the description of the research methodology, which includes the research design, research approach, sampling and population, data collections, data analysis and quality criteria. To understand the experiences and difficulties experienced by Agricultural Sciences teachers when planning and delivering theoretical and practical classes, a qualitative study was conducted.

3.2 Research Approach

The researcher opted for qualitative research approach underpinned by interpretivism paradigm. The approach was chosen for the study in order to gain a deep and nuanced understanding of people's perspectives, emotions, beliefs, and motivations regarding a specific issue, situation, or phenomenon. A research design, according to Burkingham and Saunders (2004), is a strategy or manual for gathering and analysing data that includes guidelines that help the researcher to conceptualise and observe the issue at hand. The researcher used a qualitative method and conducted semi-structured interviews with Agricultural Sciences teachers to discover more about the difficulties and experiences they face when preparing and delivering theoretical and practical sessions. According to Manubay et al., (2002), a qualitative research is one that adopts the inside perspective of social action and draws its data from the surrounding environment. The foundation of interpretivism is the notion that social processes cannot be boiled down to straightforward cause and effect chains or objective measures (Flood et al., 2003). Babbie (2010) advocates that interpretivism acknowledges the richness and nuanced meanings inherent in human experiences.

A qualitative technique, in the opinion of Bogdan and Bicklen (1988), enables researchers to observe events from the viewpoints of the participants. To enable the researcher to record each teacher's perspective, the approach was used. A comparative case study of five Agricultural Sciences teachers' planning decisions and how they implemented these theory and practical lessons in a learner-centred, outcomes-based setting in the classroom formed the basis of this study. As a result, the techniques for acquiring information drew on a variety of sources of proof. This study followed the interpretivism paradigm because it sought to comprehend the complexity and variety of human experiences by concentrating on the meanings, symbols, and interpretations that Agricultural Sciences teachers face when planning and presenting theoretical and practical lessons. It focused on comprehending how social interactions, culture, and context influence people's views, values, and behaviours.

Qualitative research uses extensive, open-ended data collecting techniques, including observations, interviews, and textual or visual material analysis (Hatch, 2002). The qualitative approach was chosen because it enabled the researcher to provide in-depth or rich data (Creswell & Poth, 2016). The qualitative approach was considered appropriate since the focus of the study was on acquiring an in-depth knowledge of teachers' challenges and experiences while planning and presenting Agricultural Sciences theoretical and practical lessons. The qualitative approach was also used for this study because, according to Woods (1996), it is the greatest way to look into teachers' subjective perceptions and ideas.

3.3 Research Design

The researcher adopted the hermeneutic phenomenological research design, because it is a strong tool for understanding personal experience, interpreting and gaining insights into people's actions and motives (Husserl et al., 1999). Cohen et al., (2000) advocate that this qualitative technique tries to study and comprehend people's lived experiences and the meanings they assign to those experiences. In the context of this study, the researcher focused on the experiences and challenges faced by Agricultural Sciences teachers during lesson planning and presenting both theoretical and practical lessons. It combines components of phenomenology, the substance and structures of human experiences, with hermeneutics, the interpretation of text or

meaning (Vithal & Jansen, 2003). In the context of this study, Agricultural Sciences teachers had explained their challenges and experiences when planning and presenting lessons on the theory and practice of Agricultural Sciences.

The goal of hermeneutic phenomenological research is to understand the participants' underlying meanings and interpretations while also documenting their subjective experiences (Bogdan & Bicklen, 1982). This study was interested in exploring experiences and challenges encountered by Agricultural Sciences teachers when preparing and presenting theoretical and practical lessons. This method emphasises that people actively create their reality and that their cultural, social, and historical circumstances have an impact on their experiences; hence, Agricultural Sciences teachers has shared their experiences and challenges in the subject when planning and presenting lessons (Flood et al., 2003). The phenomenological tradition, which stresses researching subjective experiences, is where hermeneutic phenomenology derives its inspiration. Félix-Brasdefer (2010) affirms that phenomenology aims to investigate the nature of actual experiences and the significance that people give them. Conducting research on interpretation and comprehension is known as hermeneutics; hence, it was suitable for this study, where teachers shared their challenges and experiences in preparing lesson plans for Agricultural Sciences. To understand and make sense of the experiences and narratives of the participants in hermeneutic phenomenology study, the researcher used hermeneutical concepts to understand what Agricultural Sciences teachers' experiences and challenges (Babbie, 2010).

The context of experiences is heavily stressed in hermeneutic phenomenology, which gave participants an opportunity to communicate their experiences and challenges in the offering subject (Bada & Olusegun, 2015). Understanding how cultural, historical, social, and personal aspects affect people's experiences is a goal of research. Creswell and Poth (2016) assert that the process of interpretation that researchers participate in, frequently requires conversations and teamwork with other researchers. Edwards (2013) discovered that interpretations are viewed as continuous conversations that change throughout time rather than as absolute facts. Msigala (2010) indicates that results under a hermeneutic phenomenology study are frequently summarised in narrative form to convey the core of participants' experiences. Researchers work hard to communicate the breadth and complexity of these

encounters while preserving the interpretative nature of the results by using the data collected from the participants (Biklen & Moseley, 1988). Creswell (1999) affirms that the hermeneutic phenomenological research design aims to comprehend and interpret people's lived experiences.

Its philosophical foundations, interpretative strategy, and focus on context and meaning-making comprise its distinctive elements (Jolyet al., 2016). By employing this method in this study, the researcher hoped to offer detailed and insightful insights into the participants' subjective experiences when preparing and presenting Agricultural Sciences lessons. Félix-Brasdefer (2010) reported that in phenomenological research, vivid, in-depth accounts of the events being studied are highly valued as they were presented by Agricultural Sciences teachers during the research. Bogdan and Bicklen (1982) argue that the richness and diversity of individuals' subjective experiences are what researchers hope to capture. Mann and MacLeod (2015) affirm that in a narrative approach, findings are frequently presented with several detailed quotes and descriptions that capture the spirit of participants' experiences. Phenomenology emphasises the importance of context while simultaneously being interested in the universal elements of human experience who were participants of the researcher (Creswell & Poth, 2016).

3.4 Research population and sampling

The targeted population for the researcher was qualified Agricultural Sciences teachers in the FET in the Lebopo Circuit of Capricorn South in the Limpopo Province. Purposive sampling was adopted for this study because it allowed affected individuals to share their experiences of the phenomenon under study (Grove, 1992). The non-probability sampling approach, known as purposeful sampling, judgmental or selected sampling, is frequently employed in qualitative research (Cohen et al., 2013). It entails purposefully choosing volunteers who have certain traits or features that mesh with the researcher's goals and the phenomena being investigated (Erickson, 1986). Purposive sampling involves the researcher handpicking individuals who can supply rich and pertinent information to meet the researchers' questions using their, experiences and skills. Five Agricultural Sciences teachers were sampled for the research. All five Agricultural Sciences teachers were sampled because they qualified and were the ones experiencing challenges during lesson planning and the teaching

of Agricultural Sciences theory and practice. Data was collected from all five Agricultural Sciences teachers using different data collections tools.

Biklen and Moseley (1988) report that the non-probability sampling technique known as purposeful sampling, often referred to as purposeful or selected sampling, is frequently employed in qualitative research. It entails a purposeful selection of particular people, teams, or cases in accordance with predetermined standards or study goals. Unlike random or probability sampling, where every member of the population has an equal chance of being included in the sample, this strategy does not assume that everyone will be selected for participation (Jolyet al., 2016). In the context of this study, qualified Agricultural Sciences teachers were the targeted population to be sampled. When researchers have defined the study's aims and objectives that call for a certain sort of knowledge or expertise, they use purposeful sampling. McDonald (2003) opines that purposive sampling is especially helpful when researchers want to learn more in-depth information about a certain event, population, or setting. In this study, the researcher chose Agricultural Sciences teachers to share their experiences of the challenges faced when preparing and presenting both theoretical and practical lessons in Agricultural Sciences. Potential participants or cases are required to fulfil a set of criteria before being considered for inclusion in the research (Babbie, 2010).

Flood et al., (2003) assert that these standards may be based on demographics, past experiences, or connections to the researcher issue. For instance, the criteria can include teachers who specialised in Agricultural Sciences, for them to share their experiences of lesson planning and teaching of a subject (Mann & MacLeod, 2015). There are several purposive sampling techniques, such as: Largest Variation Sampling, which is known as the process of choosing individuals with a wide range of traits or life experiences that are pertinent to the research's topic. This method seeks to include numerous viewpoints. Creswell and Poth (2016) assert that choosing people with similar traits or backgrounds to gain a deeper knowledge of a certain subgroup is known as homogeneous sampling. Selecting individuals based on predetermined norms or criteria (criterion sampling) is typical of evaluation-based research (Grove, 1992).

Finding people with particular knowledge or experience on the research topic through expert sampling is called purposeful sampling (Edwards, 2013). Snowball sampling is the practice of selecting one or a small number of participants who fit the requirements before asking them to suggest more possible participants (Kothari, 2004). Because it enables researchers to focus on people or instances that might give rich and pertinent material for their subject, purposeful sampling is especially well-suited for qualitative research, which was used for this study to select Agricultural Sciences teachers as research participants. It is frequently applied to phenomenology, case studies, ethnography, and other qualitative methodologies. Bogdan and Bicklen (1982) indicate that purposive sampling uses a sample size that is chosen by data saturation rather than statistical considerations, up to a point where new data no longer provides new insights or information repeats.

3.5 Data Collection

As described by Burns and Groove (2003), data collection is the exact, methodical gathering of information pertinent to the researcher's goal. The researcher employed field notes, non-participant observation tools, semi-structured interviews, document analysis of teachers' lesson plans, and non-participant observation methods. This study aimed to comprehend the difficulties and experiences experienced by Agricultural Sciences teachers when organising and delivering theoretical and practical sessions in Agricultural Sciences. Five Agricultural Sciences teachers' responses were gathered utilising audiotape-recorded interviews, non-participant classroom observations, field notes, and a document analysis using their lesson plans. The participants' problems, experiences, perspectives, and interpretations when designing and presenting Agricultural Sciences theory and practice lessons were explored through two-hours semi-structured interview sessions. Data was collected using non-participation observation, document analysis, semi-structured interviews and field notes tools.

The non-participation tool was opted for this study because it enabled the researcher to gain insights that would otherwise be impossible to obtain through other research methods (Creswell, 1999). Lessons were observed in classrooms to explore the challenges faced by Agricultural Sciences teachers. Document analysis was chosen for this study because it permitted the researcher to make sense of the resources used

by the sampled teachers. Furthermore, the lesson plans created by Agricultural Sciences teachers were used to collect data by analysing them before being used in class for teaching and learning (Félix-Brasdefer, 2010). Semi-structured interviews were considered for this study because they permitted interviewers to learn the answers to questions and the reasoning behind the replies by participants (McDonald, 2003). The researcher wrote field notes during the data collection and using a tape recorder machine for late use in the researcher.

Objectives	Data to be collected	Analytical tool
To identify teacher's perspective on the problems encountered in Agricultural Sciences during lesson planning and teaching.	Semi structured interview	Interpretative analysis
To identify how challenges encountered during planning and teaching affect learners academic performance in Agricultural Sciences	Semi structured interview	Interpretative analysis
To identify and categorize challenges encountered by high school Agricultural Sciences teachers while planning and presenting lesson.	Field notes and Non-participation observation	Interpretative analysis
To identify and categorize challenges encountered by high school Agricultural Sciences teachers while planning and presenting lesson.	Lesson plans	Documents analysis

3.5.1 Semi-structured interviews

Edwards (2013) indicates that due to the adaptability and capacity to provide detailed and rich data, a semi-structured interview is a useful research technique in qualitative investigations. Hence, it was used in this study for collecting data from Agricultural Sciences teachers. Researchers can use semi-structured interviews to investigate unexpected findings while still using a style of open-ended questions (Biklen & Moseley, 1988). Kothari (2004) claims that in qualitative research, where the objective is frequently to unearth subtleties and unexpected discoveries, this flexibility is essential. Campbell and Evans (2000) opine that researchers may dive deeply into participants' opinions, experiences, and emotions, thanks to these interviews. Because the questions were open-ended, the participants expressed themselves freely, resulting in a comprehensive and in-depth comprehension of the subject being studied in this study. Semi-structured interviews work especially well for collecting a phenomenon's contextual elements, which for this study was to gather data on the experiences and challenges faced by Agricultural Sciences teachers when planning and presenting lessons (Boikhutso, 2010).

By searching for context-specific data, researchers may develop a comprehensive grasp of the issue. Semi-structured interviews are participant-centred as opposed to structured interviews, which employ predetermined, closed-ended questions for Agricultural Sciences teachers (Bonnen, 2019). Waithera (2013) indicates that semi-structured interviews provide participants with the chance to express their own tales and experiences, which may be crucial while studying difficult or delicate subjects. As the researcher moves forward, the information gathered through semi-structured interviews may be iteratively examined. Bogdan and Bicklen (1982) affirm that this iterative methodology enables researchers to focus on emerging themes and fine-tune their research questions, which can increase researchers' depth and rigour. The conversational strategy used in semi-structured interviews frequently enables researchers to establish rapport with participants by building trust and a greater degree of awareness. This rapport may result in replies that are more forthright and sincere (Kothari, 2004). All these different literatures cited in this subtopic justify the suitability of this data collection tool for this study.

To better understand the difficulties and experiences of Agricultural Sciences teachers when planning and delivering both theoretical and practical lessons, a semi-structured interview was conducted. Again, the purpose of the interviews was to discover more

knowledge about the teachers' real plans for the class, the flow of the activities, the interactions the teacher anticipated with the learners, and the reasons that influenced those plans (Abdulhamid, 2015). The researcher gathered data on class objectives, the material to be covered, worksheets or textbook exercises, experimentation equipment, and the allotted lesson time. The other purpose of semi-structured interviews with Agricultural Science teachers on lesson planning and teaching was to follow up on the teachers' reflections on the lessons. Moreover, factors that affect lesson activities, dealing with learners' behaviour in relation to their level of comprehension, the types of questions they asked, and the extent to which spontaneous changes were required in relation to that, and how they affected teachers in lesson planning and teaching (Buckingham & Saunders, 2004).

Semi-structured interviews added richness to the collected data by revealing the teachers' planning for the various levels of planning (decisions about the learning programme, work schedule, and lesson plans), the intended outcomes, the choice of content, the learner activities, teaching strategies, assessment, time allocation, and the use of learning materials. The lowest unit of reflection for all the cognitive aspects and practical phases that accompanied the learning process in Agricultural Sciences was lesson preparation. The most direct evidence of the teachers' objectives for the teaching and learning process was offered through interviews, which made them the best approach for gathering data for this subject (McDonald, 2003). The teachers explained different factors, which affected lesson planning and the teaching of both practical and theoretical Agricultural Sciences.

3.5.2 Lesson observation

Kothari (2004) affirms that researchers might investigate the teaching and learning of Agricultural Sciences in the natural environment of a school, thanks to lesson observations that take place in actual educational settings of classrooms. Understanding how educational practices develop in actual classrooms requires knowledge of this setting where the teaching and learning of Agricultural Sciences take place (Kothari, 2004). Yildirim (2003) argues that a researcher can gather comprehensive and contextual data by observing Agricultural Sciences lessons in the classroom during the teaching and learning process. On the hand while relationships between teachers and learners, the dynamics of the classroom, the use of materials

and resources, and instructional tactics are all observed, giving them a full picture of the educational process of Agricultural Sciences both in theory and practice. Researchers can learn more about the dynamics of a classroom, such as interactions between an Agricultural Sciences teacher and learners, the interactions among the learners themselves, and the function of classroom management techniques by both teachers and learners (Zhang, 2008).

Burns and Groove (2003) report that understanding the social and emotional components of teaching and learning has benefited by knowing this knowledge during an Agricultural Sciences lesson observation during teaching and learning, which made non-participant observation more suitable for this study. Real-time data collection was made possible through observations, which was particularly helpful for grasping spontaneous behaviours, responses, and non-verbal indicators that had been overlooked in retrospective lesson observation of Agricultural Sciences (Borich, 2000). During observations, the researcher could concentrate on certain instructional practices, classroom management strategies, or the use of technology during the teaching and learning of Agricultural Sciences. This focused strategy allowed for an in-depth investigation by observing different activities which took place during a lesson observation of Agricultural Sciences (Kidane & Worth, 2012).

Depending on the goals of the research, observations may be made from the perspectives of teachers, learners, or both during the observation of the lesson. This adaptability enables researchers to collect information from many stakeholders to develop a comprehensive knowledge of the educational experience (Babu et al., 2015). Woods (1996) reports that researchers might monitor changes and advancements in teaching and learning techniques over time by conducting long-term lesson observations in the Agricultural Sciences classroom during teaching and learning process. It is useful to study educational initiatives or changes using a longitudinal approach. The formative use of lesson observations provided teachers with the helpful criticism they needed to advance their teaching methods; the continued improvement of educational approaches and teaching techniques benefited from this study (Creswell & Poth, 2016).

In lesson observation, teaching and learning processes are carefully observed and noted in a learning environment (Cohen et al., 2013). The researcher learnt more

about classroom dynamics, learners' behaviours, and teaching strategies using this strategy. Understanding how teaching and learning take place in a teaching environment for both practical and theoretical Agricultural Sciences was the major goal of lesson observation in this study. To evaluate teaching effectiveness, pinpoint areas for development, or investigate particular teaching and learning-related research problems, the researcher observed Agricultural Sciences lessons (Kothari, 2004). The researcher observed Agricultural Sciences lessons and collected thorough field notes to record what transpired in the classroom during teaching and learning. The researcher kept track of each Agricultural Sciences teacher's teaching techniques, learners' interactions, classroom management, usage of teaching aids, and learners' reactions during teaching and learning.

The researcher employed a non-participant observation programme or data collecting instrument to guarantee systematic data gathering (Abdulhamid, 2015). Specific details of the lesson were included in the observation procedure, which also included a list of predetermined categories or actions that were to be noted during the teaching and learning of Agricultural Sciences. The researcher observed two Agricultural Sciences lessons presented by a teacher in grade 12 classes. The goal of the lesson observations was to gain insight into how learners interact with activities and how teachers direct and motivate them to implement their own lesson plans while taking into account the time allotted and the objectives to be met at the end of the lesson (Bogdan & Bicklen, 1982). Although the observations were not videotaped, a timetable was employed, and notes were collected on the teacher's actions and the decisions they made as the session went on.

3.5.3 Document Analysis

Vanloqueren and Baret (2017) assert that reports, memoranda, letters, emails, policy documents, research papers, social media postings, and historical records are just a few of the examples of the documents that may offer a plethora of information during analysis of the document. These documents could provide insightful information, different viewpoints, and facts on the subject of the researcher, as a non-intrusive research technique, document analysis avoids face-to-face contact with participants and does not interfere with their daily lives (Kothari, 2004). When researching sensitive or private material or when participants are difficult to reach, the use of documents can

be especially helpful. Documents frequently cover a lengthy period of time and might provide a historical or longitudinal viewpoint on a subject. Researchers may follow the development of concepts, rules, or occasions, adding rich context and depth to their research.

Williams and Dollisso (2018) contend that documents are frequently produced independently of the researcher's preferences or influences, making them comparatively unbiased sources of knowledge. This might improve the data's reliability. Kothari (2004) stipulates that text, photos, audio files, video clips, and other data types can all be included in document analysis. This adaptability enables researchers to look at different facets of the research issue. Other qualitative data collecting techniques, such interviews or observations, might be complemented by document analysis. Borich (2000) argues that it might support the triangulation of results, confirm participant testimonies, or provide the researcher a wider perspective. In archives, libraries, internet repositories, or corporate records, documents are frequently easily accessible. Comparing this accessibility to gathering primary data through interviews or surveys might help the researcher to save time and money.

Examining different documents, such as teachers' lesson plans, government records, policies, textbooks, learners' work, and other textual or visual elements, is known as document analysis (Borich, 2000). The researchers may better comprehend the background, rules, and procedures of the educational system using this approach. During the data collecting procedure, an analysis of the teachers' lesson plans was done to determine the types of difficulties and experiences that Agricultural Sciences teachers have when preparing their lessons. A teacher's road map for what the class will cover and how it will be effectively taught is the lesson plan document (Erickson, 1986). The teacher must determine the learning objectives for the class meeting before a lesson can be planned.

A lesson plan covers the items on the work schedule but also goes into great depth about the activities that learners will be completing during the allotted time. Cohen et al., (2013) indicate that a lesson plan is a more compact planning unit that serves as a momentary tool. It might be focused on a topic for a day or a week. An analysis of a lesson plan, whether it is written or not, provides insight into the objectives a teacher hopes to accomplish with a particular lesson. Félix-Brasdefer (2010) advocates that

the Agricultural Sciences lesson plan aids both teachers and learners in comprehending the objectives of the subject of teaching and learning (Kaplan & Maxwell, 1994). A lesson plan gives a teacher the ability to convert the curriculum into educational activities, it aligns the teaching resources with the evaluation and aligns the evaluation with the learning objective (Hatch, 2002).

3.5.4 Field Notes

Zhang (2008) asserts that for gathering, preserving, and interpreting data in a variety of study situations, field notes are a fundamental and well suited qualitative research approach. For this study, the researcher reordered extensive, intricate, and culturally rooted data using field notes. To gain a thorough grasp of the phenomena being studied, the researcher kept a record of the observations, descriptions, interactions, and experiences as they took place during the teaching and learning of Agricultural Sciences. Babu et al., (2015) indicate that field notes are particularly well suited for investigating behaviours, events, and processes in their natural environment since they are often created in the field, where the research participants are situated. This environment, improves the researcher's ecological validity by actively participating in the participants' activities and interactions while immersed in the researcher environment, researcher had engage in participant observation of Agricultural Sciences.

Boikhutso (2010) argues that researchers might learn insights from this strategy that was not available from other data gathering techniques. Field notes make data collection flexible. Based on the researcher's goals, the environment, and the emergent nature of the data, the researcher modified their note-taking techniques (Husserl et al., 1999). As the researcher gathered more knowledge of the research environment, the researcher modified the queries and emphasis. Modisenyane et al., (2004) report that taking field notes frequently results in the identification of unanticipated or emergent themes and patterns, enhancing the researcher findings with information that may not have been immediately obvious. Bogdan and Bicklen (1982) claim that a researcher can document observations in field notes and their own feelings, opinions, and interpretations. Understanding the researcher's influence on data collection and analysis can be aided by this reflexivity. Finding unexpected or emerging themes and patterns through the use of field notes can supplement the

study's findings with new information that may not have been immediately obvious (Erickson, 1986).

The researcher made thorough field notes on the teachers' classroom preparation and teaching methodology. To prepare for the lesson on Agricultural Sciences, themes, objectives, activities, instructional materials, and techniques were noted. Borich (2000) indicates that any hurdles or difficulties a teacher faced during this phase such as a lack of materials, a lack of time, or trouble fitting the lesson into the curriculum were taken into consideration. During the Agricultural Sciences class, the teacher's teaching tactics were observed and noted in the field notes. The techniques they employed to aid learning, engage learners, and address any issues unique to the teaching of Agricultural Sciences were documented. On how learners responded to the lesson, field notes were also taken. Their degree of involvement, interest, and engagement during the theory and practice of teaching of the Agricultural Sciences class was recorded. The researcher noted if a teacher had any issues maintaining the interest of the class or if any particular learners had trouble in learning the subject (Manubay et al., 2003). The researcher recorded any particular difficulties the teacher may have encountered in controlling learners' conduct or preserving a supportive learning environment. The interactions between the teacher and learners were carefully observed and documented. The field notes detailed the interactions' nature, the teachers' inquiries, the learners' answers, and the general climate of the classroom (Buckingham & Saunders, 2004). Any difficulties the teacher had in addressing the specific requirements of each learners or communicating effectively were recorded.

3.6 Data Analysis

Erickson (1986) advocates that the organisation of the data into categories and the discovery of patterns or links between the categories are the main inductive steps in qualitative data analysis. In this study, through interpretative analysis data were analysed by listening to audio-taped interviews, documented lesson plans, and grouping written notes into units based on recurrent themes about experiences and challenges faced by Agricultural Sciences teachers when planning and presenting theoretical and practical lessons. When planning and delivering lessons, field notes drawn up from observations served as crucial resources for identifying difficulties and problems experienced by Agricultural Sciences when planning and presenting

theoretical and practical lessons. Data collection and analysis were carried out simultaneously throughout the whole study process, allowing for the possibility to expand on or gain more clarity on topics as a result of emergent themes from the analysis of numerous instances. Smit (2001) describes such data analysis as a continual and developing process.

The researcher firstly separated the data collected and compared and contrasted how each teacher approached planning, how they prepared for lessons, the factors they took into account, and how they implemented each lesson in the classroom during teaching and learning process of Agricultural Sciences. To respond to the research questions of this study, teachers did a cross-case comparison based on the thorough content analysis of each situation. To illustrate the various and related planning techniques and approaches in connection to lesson presentation, the results from comparisons and contrasts in the data acquired were employed. The results were discussed in detail to demonstrate the breadth of the difficulties and experiences that Agricultural Sciences teachers encountered when planning and delivering lessons.

Babu et al., (2015) argue that document analysis starts by determining the scope of the analysis, including the types and number of documents, which were lesson plans examined. Relevant documents of the analysis, which were lesson plans, were gathered. Reading through the lesson plans carefully while keeping the research objectives in mind was done. Taking notes throughout the execution of the lesson plans, paying attention to the documents' structure, context, and any metadata that were available, was also done by the researcher. Relevant data and information from the documents were extracted. This included facts, statistics, quotes, and any other pertinent content. The extracted information was categorised into relevant groups or themes (Boikhutso, 2010). This helped in organising the data and identifying patterns or trends. Spreadsheets were used to manage and categorise data. Coding was done manually, where coded and categorised data was analysed to draw meaningful insights and conclusions. The evidence in the documents supported interpretations and finally, the findings were presented in Chapter 4.

3.7 Quality criteria

Since the researcher adopted the qualitative research approach, the rigour of the research had to be evaluated using quality standards. Credibility, dependability,

confirmability, and transferability are four aspects often utilised to ascertain the quality criteria of the study. Noble and Smith (2015) define trustworthiness as the originality of the findings and how participants perceive the findings are trustworthy; the outcomes also rely on the availability of in-depth, relevant, and focused data.

3.7.1 Credibility

Félix-Brasdefer (2010) indicates that credibility is the measure of how plausible, reliable, and reflective of the participants' viewpoints and experiences a qualitative study's conclusions are. The researcher used a variety of strategies, including extended engagement, triangulation, member verification, and extensive description, to create trustworthiness. A better knowledge of participants' experiences was made possible by developing trust and rapport with participants by spending enough time in the field, engaging with them, and becoming fully immersed in the researcher situation. The credibility of results can be increased by collecting and analysing data from various researchers, methodologies, or data sources (Kaplan & Maxwell, 1994). Researchers can find trends and guarantee consistency by confirming data from several viewpoints. Buckingham and Saunders (2004) stipulates that participants can confirm the validity and correctness of the researcher's interpretations by returning results for their examination and comments, a process known as member checking or respondent validation. The credibility of the researcher is increased by including extensive and thorough explanations of the research setting, participant characteristics, and the research procedure (Moustakas, 1994). This degree of specificity aids readers in understanding and assessing the reliability of the findings.

3.7.2 Transferability

The term "translatability" describes how much a qualitative study's conclusions may be used in or relevant to various contexts or situations. It deals with the issue applicability whether the conclusions may be applied to groups or circumstances that are similar to those in the original research. Researchers use methods including rich description, purposeful sampling, and theoretical saturation to prove transferability. Readers can evaluate the application of the findings to their own circumstances by reading full and complete explanations of the research environment, participants, and the data gathered. By providing context, you make it easier for people to assess the parallels and divergences between the researcher's environment and their own

(Kothari, 2004). Purposive sampling, which involves choosing individuals based on predetermined criteria, helps researchers to guarantee diversity and record a variety of viewpoints (McDonald, 2003). The possibility that the results will be applicable outside of the individual participants is increased by this sampling strategy. The goal of research is to achieve a theoretical saturation point at which more data collection does not produce fresh or novel insights. The findings are more transferable because of this saturation, which shows that the findings have caught the key elements of the phenomena under research (Hatch, 2002).

3.7.3 Confirmability

Confirmability refers to the impartiality and neutrality of the researcher findings, demonstrating that the information was gathered and processed without the interference of the researchers' prejudices and preferences (Grove & Fisk, 1992). Researchers employ strategies including reflexivity, an audit trail, and retaining an impartial viewpoint to ensure confirmability. Reflecting on oneself helps researchers become aware of their biases, presumptions, and other possible influences that may have an impact on the researcher process and conclusions (Hatch, 2002). This understanding reduces the influence of their own viewpoints on the interpretation of facts and helps to promote transparency. It also assists to show the neutrality of the research process and analysis, similar to how an audit trail establishes reliability. The researchers' interpretations and findings may be assessed and verified by others by maintaining an extensive and transparent audit trail (Moustakas, 1994). It is important for a researcher's work to keep a certain distance from hypotheses, preconceptions, and personal convictions that could affect the researcher process. To improve the researcher's capacity to be replicated, researchers deliberately take into account alternate theories and interpretations.

3.7.4 Dependability

The consistency, stability, and dependability of a research's findings throughout time and in many situations are referred to as dependability (Babbie, 2010). Dependability answers the query of whether the research's outcomes would be comparable if the investigation was conducted again. Researchers use techniques, including detailed documentation, an audit trail, and peer debriefing to establish reliability. Researchers keep meticulous records of the research procedure, including the actions conducted,

judgments made, and modifications made during the research. This documentation facilitates the reproducibility of the research process and promotes transparency. An audit trail entails recording choices made during the research process, including data gathering techniques, data analysis procedures, and interpretations (Devers & Frankel, 2000). It promotes transparency and makes it possible for others to understand the researchers' thinking and choices (McDonald, 2003). Peer debriefing, or getting input from other researchers may assist in making sure that the researcher's methods and conclusions are rational, consistent, and backed up by evidence (Kaplan & Maxwell, 1994). This other viewpoint may help to increase the researcher's trustworthiness.

3.8 Ethical consideration

Vithal and Jansen (2003) indicate that to prove that a researcher has taken into account the welfare and rights of the researcher participants, ethical issues in a qualitative research technique are crucial. Ethical concerns ensure that a research is carried out properly, honestly, and in accordance with ethical standards (Babbie, 2010). The following are the important details to provide when writing about ethical issues in a qualitative research approach:

3.8.1 Permission to carry out a study

Since human beings participated in the study, the University of Limpopo's Turfloop Research Ethics Committee (TREC) was consulted for the application of ethical clearances so that permission to conduct the research could be granted prior to the commencement of the study. The researcher wrote to the principals of the selected schools and the Limpopo Department of Education (LDoE) seeking permissions to utilise the schools for the data collection process of this study. Appendix C was sent to the Limpopo Department of Education management and was also submitted to the schools' principals where data was collected. Appendix E is an informed consent which was given and explained to the research participants on what was expected from them.

3.8.2 Informed consent and voluntary participation

A key tenet of qualitative research is voluntary participation, which emphasises that participants should never be forced, threatened, or persuaded to participate in a study

(Devers & Frankel, 2000). Any sort of undue influence that would have interfered with the participants' capacity to decide for themselves whether or not to participate in the researcher has been avoided by the researcher. No one was ever intimidated, bribed, or coerced to take part in this study. The researcher made sure that participation was totally voluntary and free from outside pressure. The option to withdraw from the research at any time, without cause or consequence, was made clear to the participants. The researcher respected the decisions of the participants and did not try to convince them if they did not want to take part in the research (Moustakas, 1994).

3.8.3 Confidentiality and privacy

The researcher was successful in maintaining the privacy of the participants' data. This entailed making sure that sensitive information, such as names and personal data, was kept private and was not shared with unauthorised parties. During the data collection, analysis, and reporting phases of the research, the researcher respected the privacy of the participants. This involved employing pseudonymous or anonymous data and making sure that only those involved in the research who were permitted could access the information. The participants' personal information was protected from any unscrupulous sources as indicated by the POPI Act.

3.8.4 Respect, dignity, and standard core

All participants in the research were treated with respect, and the researcher was aware of their freedom of choice. This entailed gaining informed permission and giving participants the freedom to choose whether or not to participate in this study (Grove & Fisk, 1992). Throughout the course of the researcher project, participants were treated with respect. Participants did not experience shame, embarrassment, or excessive stress throughout the researcher. Participants got the treatment from researcher that was on par with or better than usual for the relevant demographic or setting. This involved dealing with any negative incidents or making sure that participants had access to the right kinds of assistance (Flood et al., 2003). Their culture and ethnicity were honoured by not asking for them during the data collection.

3.8.5 Benefits and harm

The benefits that could come from the research were carefully considered by the researcher and were explained to the participants. These advantages included

furthering scientific understanding, enhancing participant or societal wellbeing, or influencing changes in practice or policy (Grove & Fisk, 1992). It was the duty of researcher to prevent the participants' exposure to risk and harm to the greatest extent possible. This encompassed preventing impairment to one's physical, mental, social, or financial well-being by virtue of having participated in the study. The goal of ethical research was to reduce risks while maximising rewards (Babbie, 2010). It was made clear that all participants were not going to be subjected to any harm during the research.

3.9 Summary of the chapter

The research design of the current study, methodologies, sampling, processes, tactics, and the reliability of the data acquired were all addressed in this chapter. The researcher was able to concentrate on the difficulties and experiences that Agricultural Sciences teachers faced when planning and delivering theoretical and practical lessons. The qualitative research approach was used in the study. The next chapter contains the presentation and analysis of the collected data**.**

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 INTRODUCTION

The previous chapter focused on the research methodology, which encapsulated the research approach and design, sampling, data collection method, data analysis, quality criteria, ethical consideration and the conclusion of the chapter. This chapter starts by presenting participant teachers' demographic information. In this chapter, the study's results are also presented and discussed. The findings are based on the results of the documents analysis of the lesson plans of Agricultural Sciences teachers, field notes taken during the non-participant lesson observation and the semi-structured interviews conducted Agricultural Sciences teachers in Lebopo Circuit, Limpopo Province. The purpose of the researcher was to explore teachers' challenges and experiences when planning and presenting theoretical and practical lessons on Agricultural Sciences. There were three research objectives. Firstly, the study sought to identify and categorise challenges encountered by high school Agricultural Sciences teachers while planning and presenting lesson. Secondly, the study intended to identify how challenges encountered during planning and teaching affect learners' academic performance in Agricultural Sciences. Lastly, to investigate teacher's views on the challenges encountered during planning and teaching and how it affects learners' academic performance in Agricultural Sciences

4.1.1 Biographical information of teachers

The researcher selected five Agricultural Sciences teachers. The participants remained anonymous throughout the study to protect and ensure their confidentiality. The following table represents the biographical information of the participants in terms of gender, age, experiences of teaching the subject (experienced or novice) and their qualification(s) in relation to the Agricultural Sciences.

Summary of participants' biographical information

Name	Gender	Age range	Number of years teaching Agricultural Sciences	Qualification in relation to Agricultural Sciences	Attending Agricultural Sciences content workshop
Teacher A	Female	35-55	10-35	Diploma	No
Teacher B	Female	26-35	0-4	Honors degree	Yes
Teacher C	Male	21-28	0-2	Degree	Yes
Teacher D	Male	21-35	0-6	Degree	Yes
Teacher E	Male	35-50	10-30	Diploma	Yes

4.1.2 Descriptions of the participants

4.1.2.1 Teacher A of School A

Teacher A is a female teacher who teaches Agricultural Sciences from grade 10 to 12 in School A. She has 25 years of teaching the subject in three different schools. She started teaching while Agricultural Sciences was still offered in standard and high grades. She used to get a 100 percent pass rate during those times. At the current school, she only obtained 100 percent three times, but her learners never performed below 80 percent. The teacher uses the Perennials teaching philosophy where she believes that teachers' knowledge passed through the ages should continue to be part of the curriculum. Perennials focus their teachings on logic, analytical thinking, and reasoning. To her, only fixed information over the ages is relevant, and does not consider learners' input. The teacher did her teaching diploma at the college of education, where their teachers were passing their subject knowledge to them. So, the teacher believes that a lesson plan must be a combination of the textbook and the knowledge of a teacher. The teacher believes that learners should remain the vessels that wait for the information from the teacher; hence, the lesson prepared should deposit subject information to learners. The school is based in the Capricorn South district in the Limpopo Province, South Africa. Previously, she had 55 learners where only one failed and obtained 2 distinctions.

4.1.2.2 Teacher B of School B

Teacher B is a female young teacher who teaches grade 12, 11 and 10, with just three years of teaching experience in Agricultural Sciences. She also has an honours degree in Agricultural Sciences. She has obtained a 100 percent pass rate since she took over the subject. When creating a lesson for Agricultural Sciences, the teacher draws on the concept of progressivism, a learner-centred approach to education. Here, learners ask questions using the scientific method, and instructors assess them by giving them projects and portfolios. Progressivists provide learners with what they require rather than prescribing and regulating the educational process. At the university, the teacher completed her bachelor's degree in teaching with honours. As a result, the teacher feels that a lesson plan should be designed is so that learners may take charge of their education, with the teacher acting as a facilitator. The teacher also thinks that learners should have authority over the process of teaching and learning where skills and knowledge are transferred between the teacher and learners. Prior to the collection of data for this study, she had 27 learners where no single learner obtained a distinction. The school is located in Capricorn South in the Limpopo Province, South Africa.

4.1.2.3 Teacher C of School C

Teacher C is a novice teacher with just one-year experience in teaching Agricultural Sciences in grade 10, 11 and 12. The teacher adheres to the constructivist teaching philosophy, which promotes learner engagement in both instruction and learning. Learners in a normal classroom are allowed to experiment with ideas and exchange knowledge in unconventional ways. Unconventional ways is one of the most efficient learning methods available today, and the preferred teaching philosophy that teachers are attempting to adopt. The teacher was trained under the CAPS, and was of the opinion that learners should be in command of their own education. The teacher completed a Bachelor of Education at university. The teacher understands that learners do not just absorb material; they actively create knowledge based on their experiences and values. Teachers assist learners in developing their representations and incorporating new knowledge by drawing on their experiences in the world. He had 30 learners in the previous year before the data collection where he obtained a

100 percent pass rate with one learner who scored a distinction in grade 12. The school is located in Capricorn South in Limpopo, South Africa.

4.1.2.4 Teacher D of School D

Teacher D is a male young teacher with 4 years of teaching Agricultural Sciences from grade 10 to 12. The teacher has a good academic performance record both in grade 10, 11 and 12, where learners never obtained less than 70 percent since he started teaching all grades. The teacher firmly believes in constructivism, which by its very nature keeps learners engaged in the process of teaching and learning. Learners in a normal classroom are allowed to experiment with ideas and exchange knowledge in unconventional ways. It is one of the most efficient learning methods available today, and it is the preferred teaching philosophy that teachers are attempting to adopt. The teacher completed his undergraduate studies at university. The teacher understands that learners do not just absorb material; they actively create knowledge based on their experiences and values. Teachers assist learners in developing their representations and incorporating new knowledge by drawing on their experiences in the world. The teacher uses this philosophy in lesson planning and teaching Agricultural Sciences. In the previous years before data collection, he had 45 learners where he obtained 91.5 percent with 5 learners who obtained distinctions. The school is based in Capricorn South in Limpopo Province, South Africa.

4.1.2.5 Teacher E of School E

Teacher E is a male teacher with 21 years teaching experience who is currently teaching Agricultural Sciences starting from grade 10 to 12, who happened to be a departmental head of the science department. When creating and executing lessons, the teacher applies essentialism. Essentialism is a teacher-focused ideology that seeks to impart fundamental abilities. Essentialists hold that the curriculum is built on the principles of teaching and that there is a universal reservoir of knowledge available for acquisition. The teacher completed his teaching diploma at a college of education. According to the teacher, this educational system promotes mental training by emphasising the transmission of a number of challenging subjects to advance pupils to the next level. The teacher had 80 learners before data was collected and has obtained a 100 percent pass rate with 8 learners who obtained distinctions. The school is located in Capricorn South in the Limpopo Province, South Africa.

4.2 RESEARCH QUESTION 1: WHAT ARE THE CHALLENGES TEACHERS ENCOUNTER WHEN PLANNING AND PRESENTING LESSONS IN AGRICULTURAL SCIENCES?

This research question was answered through a lesson observation and document analysis.

4.2.1 Non-participant observation data

Data gathered from five Agricultural Science teachers during the theoretical and practical lessons in the classroom is presented in this part. Five Agricultural Sciences lessons were observed by the researcher, which were theoretical and practical, during the teaching and learning process. To comprehend and investigate the difficulties and experiences experienced by Agricultural Science teachers in both theory and practice, the researcher noted a total of three lessons. Teachers in Agricultural Sciences impart both theoretical and practical applied knowledge. Lesson observations were conducted in the order specified by the school timetable. During the data collection process, the researcher combined the observation schedule with field notes.

4.2.1.1 Explanation about the data collected through non-participant lesson observation

Teacher A

Theory lesson 1: Animal Reproduction (Pregnancy and Parturition)

On the first day of observing Agricultural Sciences lesson, the researcher arrived in the morning to begin with the data collection. The researcher went there at 07h30 and found the learners seated. The teacher greeted the learners and introduced the researcher to the learners and explained to them why the researcher visited them in class. She then introduced the topic, which was animal reproduction. Thereafter, she asked the class what their understanding of the topic was, and then two learners gave their understanding of the topic. She then indicated to the learners that the topic was critical in the subject, as it deals with production of different products from animals such as milk and eggs. Some learners did not have a textbook while those who had it were sharing it. This was as a result of the school not having enough textbooks for the learners. She came with handouts and distributed them to the learners. She then started introducing male and female reproductive organs using a cow and a bull as

examples. She indicated the importance of knowing the reproductive system of animals, specifically cattle. She stated that it helps them to assist animals when giving birth but struggling and that is called dystocia. Learners showed an understanding of the topic, but one learner asked if human and animal reproductive systems are the same. Then, there were several questions asked by the learners on this topic. One learner asked what caused a bull to mate with a cow. The other question was how long does a cow become pregnant, and lastly, one learner asked if there were doctors who specialised in treating animals. The teacher concluded the lesson by giving them a homework from the same handout. The homework was on the other side of the handout. The handout had two diagrams of male and female cattle with questions about functions, and the learners were asked to provide names of the organs represented by alphabets. The teacher responded to first question by saying that animals' mating is controlled by hormones. For the second one, she said it depended on an animal but normally, it takes 9 months 9 days. Answering the last question, she indicated that yes indeed there is an animal doctor called a veterinarian. Then learners indicated that they understood the lesson, but one learner was nodding his head, and then the period ended, learners moved to the other classroom.

Lesson 2: Tools and the equipment used for the practical lesson

A second visit was made to the school, where the researcher spent more time compared to the first class visit that focused more on the theoretical aspects of preparing and using a lesson in the teaching and learning of Agricultural Sciences. The period was after break. The researcher and the teacher went to the classroom that was used as a laboratory by the school. Upon arrival at the classroom, the researcher noticed a few tools on the front desks. The topic of the practical lesson was determining the soil texture, colour and structure for grade 11. After 3 minutes, the teacher started with the practical lesson. She then grouped the learners into five and six members per group, where each group was provided with a printed practical manual. The teacher then started explaining the lesson to the learners where tools such as the soil samples, test sieves, gloves and bottles of water were explained in the lesson. During her explanation, she displayed each tool to the learners. The learners seemed familiar with the equipment and the practical lesson itself. The teacher then indicated that each group must ensure that they come forth to collect soil samples and some equipment. Most of the available tools were not in a good condition.

The school only had two jar tests, some of the gloves were broken in some groups, while some of the soil samples were leaking from the sample plastic. Learners started opening their practical manuals and checked if all the required tools were available. Most learners seemed to enjoy touching the tools in the practical session. The researcher saw almost three new electronic balances. Then learners rotated in weighing their soil samples from their respective groups. The learners operated the electronic balance quite well.

Lesson 3: Practical lesson (Determining soil texture, colour and structure)

The practical lesson was based on determining the soil texture, structure and colour of different soil samples. This practical lesson was taken from the practical manual which was supplied to the school by the Department of Education specifically for Agricultural Sciences. During the third time visit to the school, learners were done with numerous assessments as they were only left with the June examination, which was to commence in a week and a few days from the day of the visit. The practical lesson was conducted simply because it had to be done. This means that the learners were done with the topics on the theoretical part of the subject. Learners only attended the first period and from then on were fulltime in the laboratory for the practical component. The practical lesson started when each group had measured the soil samples. Before the lesson started, the teacher indicated that each group member needed to participate and had to be careful as they conducted the practical. The researcher did not hear the teacher explaining to the learners the procedure to conduct the practical component. All the groups were busy working while opening the practical manual supplied to them by the teacher. There were three learners per group who were trying to set up the tools collected in preparation of the practical. They were sorting different types of soil on the table and labelling them while others were paging the practical manual. The learners tried to compare their steps in the practical component with the ones found in the manual. The learners then started to perform the practical from their respective groups. The teacher told them that on the following day, they will write a practical assessment based on the practical lesson they were doing. Towards the end of the period, most learners were done with the practical lesson, but were busy recoding their findings until the period ended.

This was the only practical lesson assigned to the learners for the whole year by the Limpopo Department of Education, because in term three, the learners were going to be given an assignment. The teacher made some movements after a few minutes to check on the learners. Some learners were not even wearing gloves while performing the practical lesson. Then learners started leaving the laboratory in different groups. A majority of the learners seemed tired from the lesson. After a while, when the teacher wanted to end the period, numerous learners were not available and only a few learners were left.

The teacher did support learners during the teaching and learning processes. In fact, regarding the practical component, the teacher did not explain in detail to the learners how the practical must be conducted. The teacher just gave the learners the PAT document so that the learners go through it for practical instruction. Similarly, during the theoretical lessons, the teacher taught the learners poorly. The teacher used only one teaching method, which was the teacher-centred approach. The teacher was available during the assembling of tools in the practical lesson. All the teachers always wanted more time after the period was over. Her lesson plan did not indicate how the learners would be assessed, it just stipulated that the learners will be assessed. During the observation of the lessons by **Teacher A,** it was clear that the teacher still needed a training or workshop to accord them good skills and knowledge on how to develop good and standard lesson plans for both the theoretical and practical components of the subject. The teacher used an inappropriate teaching method and the lesson was incompatible with the lesson objectives set for the lesson. Moreover, the assessment of the lesson was not aligned with the lesson's objectives. There were three lesson plans but only one lesson plan's objectives were attained while the other two lesson plans were poorly formulated.

Teacher B

Theory lesson 1: Basic Agricultural Genetics

When the researcher arrived at Teacher B's school, the teacher was already waiting for the researcher at the staff room. The researcher and the teacher then went to class and found the learners waiting for. The lesson was at 07h30 since it was the first period. She greeted the learners and introduced the researcher as a guest in her classroom. The learners heartily welcomed the researcher. The teacher went on to tell

the learners reason for the researcher's visit. The teacher wrote the topic 'Genetics' on the board and asked learners to share their understanding of the term. The learners then started sharing different views in an attempt to define the term. The teacher introduced the topic to the learners by indicating that the learners' Agricultural Sciences accommodated basic agricultural genetics. She then required them to define terms such as chromosome, genetics, dominant, phenotype and alleles. The learners seemed to follow the lesson from the beginning. This was evinced by their active participation during the lesson. The teacher asked the class to define the term genetics, and almost the entire class raised their hands, and one learner was pointed at by the teacher for a response. The learner defined genetics as the study of how traits are passed from parents to the offspring. The teacher asked the class to applaud the learner. She allowed learners to start asking questions where they did not understand, as she introduced a subtopic on monohybrid and dihybrid. One learner asked what caused parents to look like their parents. The teacher answered it by saying this was determined by the genes which are found inside the cell.

The researcher then informed the teacher that he would visit for the second time, where they focus will be on the practical component of the subject. The teacher indicated that she would update the researcher on the day when the alimentary canal of a non-ruminants will be considered for the practical lesson.

Lesson 2: Tools and the equipment used for the practical lesson

On the second day of the researcher's visit to observe the practical lesson, the chapter on which the lesson would be based was already done and passed in the weeks prior. The teacher started by explaining the tools required to perform the practical lesson. She gave an example of how the alimentary canal must be taken out of the chicken while making reference to the page number on the prescribed textbook. The teacher indicated that each group needed tools such as boiled water, a knife; gloves, a live chicken, scissor, bucket and bin. The teacher told the learners that if their practical lesson was successfully done, their alimentary canal must be similar to the one on page 27 of the textbook. The learners seemed to enjoy the teacher's explanations on the tools to be used in the practical lesson. After the teacher's explanation of the practical, the learners were then given an assessment in groups of four members. The teacher instructed them to collect different types of tools, which they need to conduct

the practical lesson. The teacher told them to keep all the tools to prepare for the practical lesson for another day. The teacher moved around the learners' desks checking the arrangement of the tools. She then stopped at one group, asked them where the other tools were because they had a shortage of tools on their table. The learners then started discussing the assessment and writing as a group and the teacher gave each group a copy of the memorandum of an assessment given to them. The teacher then ended the class after giving them the marking guidelines.

Lesson 3: Practical lesson taking place (dissecting a chicken to take out the alimentary canal)

On the last day of the researcher's visit for the practical lesson's conduction, the researcher found both the learners and the teacher waiting for the researcher, as they were ready to start with the practical lesson. The researcher found all the learners wearing gloves to show that they were ready to start the practical lesson. The learners were given a document in their respective groups, which entailed instructions for the practical lesson. Then, each group started reading the steps while water was boiling from a big urn where the practical lesson was conducted. The teacher emphasised that during the cutting of the neck of a live chicken, the learners needed to be careful, so that they would not cut the esophagus and pharynx. She also indicated that the learners needed to be careful of burning themselves with hot water and that they needed to use the knife judiciously. The learners managed to use all the available tools to perform the practical lesson. Each group had an open table where they presented an alimentary canal of the chicken. During this time where learners were busy performing their practical, the teacher was moving around the classroom monitoring each group, but not saying anything. The teacher stated that when each group was done, they must invite her to their group.

The learners presented their alimentary canal on their tables and showed the different parts of an alimentary canal. After that, the learners showed the different organs of a chicken's alimentary canal and further stated the function of each organ. At the time, the teacher was busy moving around, visiting different groups to support them. The teacher supported the group that was already on the step of taking out the alimentary canal by informing them of a genteel way to take out the alimentary canal. She told one group: ''*You can allow only one person to take out the alimentary canal than being*

many doing that''. She further moved to another group where she indicated that they did not need to rush when taking out the alimentary canal because it could break. The teacher moved to all different groups during the extraction of the alimentary canal. Thereafter, all the groups managed to extract the alimentary canal. However, two groups had incomplete organs due to their failure to extract the alimentary canal carefully. The teacher visited all the groups to confirm the completion of the task. Upon arrival, the teacher went to every group checking if all the parts from the mouth to the cloaca were available. The teacher then completed her rotation of all the groups and indicated that they were then at the end of the practical lesson. The learners then started to wash the tools used during the lesson. The teacher went back to take her seat. Then, the tools were placed in a box after the practical lesson. The learners were given the whole meat to cook after the practical lesson. Thereafter, the teacher ended the lesson and the learners left the class.

The teacher had a very good theoretical lesson with the learners, but at some point, the teacher had to skip some of the work indicating that it was not important for curriculum. Still, the time allocated was not enough to complete the content intended to be delivered during the period. It could be that the content prepared was too much to fit in a 1-hour period. Indeed, the researcher observed that the teacher wanted to continue with the lesson even when the period was over. The teacher tried to give learners chances to ask questions during the theoretical lesson. However, during the practical sessions, the teacher did not explain anything related to the practical lesson to learners on what needed to be done during the practical performance. The learners had to share ideas of the practical procedures within their groups. Comparing different Agricultural Sciences teachers who participated in the researcher, they all need to be trained on how to draft a good lesson plan that meets the standards proffered by the Department of Education.

Teacher C

Theory lesson: Animal Reproduction (male and female reproductive system)

Upon the researcher's arrival at the school, it was on break time. The researcher entered into the staff room and sat there until the break was over. The teacher went to class alone for a few minutes, and then came back to fetch the researcher. The researcher and the teacher then went to class and found the learners seated. The

teacher then greeted the learners and quickly introduced the researcher and told the learners the learners the reason for the researcher's visit. Thereafter, he ordered one learner from the front to erase the chalkboard. He then indicated that since animal reproduction was introduced last week, the class on the day was a continuation. The teacher wrote on the board 'male and female reproductive system' as a subtopic. He emphasised that the topic focused on animals and not humans. The learners seemed deeply interested in the topic. He started by teaching them without giving them any handout. He then indicated that on their spare time, they could check the diagrams in their textbook. The learners asked him several questions, precisely on the signs a cow shows when it is on heat. The teacher responded by saying that when the cow is on *oestrus*, it shows many signs such as, mounting others and allow them to mount her back. The teacher further indicated that there were instruments that revealed a cow in heat such as a pedometer. He said that a pedometer is a like a belt that is placed on the limb of a cow and releases a reading as the cow moves. When the class was almost concluded, he distributed handouts to the learners and indicated that they were their individual homework and must be written. He told them that the corrections would be done on the next day. The handouts as homework had a table with statements and terms that the learners had to match in columns A with B. The period ended and everybody left the classroom.

Lesson 2: Tools and equipment's used for the practical lesson

On the second visit by the researcher in the school, the researcher arrived later after break and found the teacher in a classroom with learners. The researcher entered the classroom and welcomed by the teacher. The aim of the researcher's visit was made to the entire learners in the classroom, where all learner made a round of applause. Learners were already grouped into their groups, and the classroom had eight groups of learners. Each group had a knife, bowel, water in a 20l of container, gloves for three learners. The teacher started asking group leaders to come and collects handouts which were pictures demonstrated four compartments stomach of ruminants' animals. The teacher remains seated where learners started discussing amongst themselves in their groups using the picture given to them. The handouts had few question which were based on the four stomach of an alimentary canal of a sheep. The main purpose was to identify the names of each stomach compartment and give characteristics of

each. The period ended and learners started leaving the classroom without the permission of the teacher.

Lesson 3: Practical lesson taking place (identification of an alimentary canal of a ruminant animal)

On the third day of the researcher's visit it was Friday, the teacher was in a hurry to attend workshop, so the agreement was to use the first period at 7h30 in the morning. On the arrival in the morning, the researcher found both learners and the teacher waiting for me in the classroom. Learners were already in their respective groups, wearing the gloves. Each group had a plate which had four types of tripe. The researcher was given and seat and learners were already burning to start the practical. the teacher gave learners permission to commence with their practical. the teacher started moving around the groups monitoring in silent. Learners started classifying the tripe based on their names, they were also making reference from the handouts provided to them in the setup of the tools. Learners took roughly 30 minutes to conduct the practical. the teacher gave them some hand out alerting them that they need to study so that on Monday they will write a practical test. Learners started discussing those handouts and when the period end they were having arguments in their own groups. Then the period ended, they were instructed to move to their respective classes.

The teacher tried to use different teaching methods during the teaching and learning of theory. However, the lesson was not useful since the teacher was always talking without giving the learners a chance to make their contribution to the lesson. Thus, the lesson entailed the teacher-centred approach, which was similar to the approaches of teachers A and B. During the practical lesson, the teacher gave the learners PAT and allowed them to go through it without any explanation to the learners. Thus, teachers **A**, **B** and **C** all distributed PAT documents but did not give any support to the learners on how to conduct the practical lesson. However, during the practical lesson, **teacher C** moved around the different groups at their tables, but the teacher was not saying anything.

Teacher D

Theory lesson 1: Basic Agricultural Chemistry

On the researcher's first visit to the school, he arrived after break, as the class was supposed to start in the second period after break. The researcher arrived at the school and the teacher took him to the staff room. After the first period, the researcher and the teacher rushed straight to class, and found the learners seated orderly. The teacher greeted the learners and did not waste time. He told the learners the researcher's name and the reason for the researcher's visit to their school, particularly their classroom. He then went to the board and wrote the topic 'Agricultural Basic Chemistry'. He then asked the learners to share their understanding of the topic. Most learners raised their hands in response. The teacher nodded when some learners stated their understanding of the topic. He then explained the main purpose of the topic and what it was all about. However, the researcher could tell that some learners were confused about the topic. The learners' participation was minimal. This was seen when the teacher asked questions and learners did not respond. The teacher asked them to differentiate between a heterogeneous and a homogeneous mixture and no one answered. Again, no learner asked the teacher any question. However, when the teacher was teaching and asking the learners if they understood, they kept quiet. He gave the learners a homework based on elements and mixture. The period ended and everybody left the class.

Lesson 2: Tools and the equipment used for the practical lesson

On the researcher's second visit to the school, the teacher had long been waiting for the researcher to arrive. The researcher arrived during break and the period took one hour thereafter. The researcher and the teacher went straight to the school's laboratory and found the learners there. The teacher instructed them to remain in their groups. The teacher had prepared a practical lesson for grade 10, which was based on the identification of different rocks found in different biomes of South African provinces. Then, the learners started running to take the materials, and the teacher told them to give each other chances. He then instructed each group through their group leaders to collect materials from the back side of the classroom where they were placed. They started taking five different types of rocks per group. They then took rulers, gloves, water, the PAT manual book, eye protectors and a lab coat per group. Each group had a lab coat, but the coats were different in colour, and some of them were dirty. Each group managed to assemble the tools available to them. The teacher moved around all the groups checking if they all had the required material for the

practical lesson. At that time, the learners were busy arranging rocks and placing them in different groups, while classifying them. Other learners were checking the practical manual to determine if they were doing the right work. The teacher gave the learners handouts as homework. The handouts had a table with different rocks that the learners were to identify based on the characteristic of each rock. The teacher ended the class.

Lesson 3: Practical lesson taking place (Identification of different rocks found in different South African provinces)

On the third visit, the researcher arrived early in the morning, as the first period had to be used for data collection. The researcher and the teacher went straight to the laboratory and found the learners waiting for them. Learners seemed to be happier when they saw the duo. The teacher greeted them and asked them if they still remembered the researcher and sat down. The learners started paging the practical manual as they were talking in their groups and conducted the practical. Only one learner per group was wearing a lab coat, gloves and eye protectors, as that learner was the one touching the materials and leading the practical lesson. The teacher did not even bother to move around this time, but simply sat down and seemed to be marking scripts. As the learners were busy conducting the practical lesson, they were making noise and the teacher repeatedly told them that they were making noise, even to a point of telling them that he would dismiss the group that will be found making noise. However, the learners did not stop making noise and kept moving to different desks. Later on, the researcher noticed that numerous learners were not wearing any protective clothes while touching the samples and working. Learners were busy arranging the apparatuses for the practical lesson and setting up for the practical through their leader. Learners continued to conduct the practical by putting labels on their samples according to the table. They simply removed their school jerseys and started working. Some learners started leaving the laboratory after 1 hour without the teacher's permission. The teacher remained seated. The teacher then decided to end the class. He indicated that on the following day, the learners will write a practical test, and dismissed the class.

Teacher D was energetic during the teaching and learning of a theoretical lesson. However, the learners were confused by the topic, Basic Agricultural Chemistry. Consequently, the teacher spent more time trying to explain to the learners so that

they could understand the topic. This led to the teacher spending more time trying to give the learners a chemistry background, and as such, more time was wasted. All Agricultural Sciences teachers who participated in the research had a challenge regarding time management during teaching and learning. However, **Teacher D** was worse because he covered little content within the stipulated time. He used a teacher-centred approach during the theoretical lesson, where learners did not even ask him a question, unlike with **Teacher A** where the learners were asking questions. During the practical lesson, the teacher was seated and busy on his cellphone. The learners were making noise and wandering in class. The learners had to lead themselves without any help from the teacher in terms of explaining to them how to conduct the practical lesson unlike **teacher B** who moved around the learners' groups while they performed the practical lesson. One can safely say that all Agricultural Sciences teachers who participated in the study did not execute their lesson plan to the full because some objectives were not achieved due to poor time management and many factors such as the shortage of teaching and learning resources and an inappropriate pedagogical style.

Teacher E

Theory lesson 1: Biomes of South Africa

On the researcher's first day of arrival at one of the selected schools, he found the teacher already waiting for him so that they can use the first period for data collection. The lesson was done in grade10. The researcher and the teacher thereafter rushed straight to class, which was a mobile one. The teacher greeted the learners and introduced the researcher to them and told them the reason for the researcher's visit. The teacher introduced a topic called 'Biomes of South Africa'. He then asked the learners to share their understanding of the topic. No learner raised a hand to answer. The teacher then started by defining the term 'biome' for the class and mentioned seven biomes found in Southern Africa. The teacher then told learners to open their textbook to gain an understanding of how each biome looks like on the diagrams in the textbook. The learners were excited to see different pictures in the textbook which were showing the various biomes found in South Africa. The learners started asking questions about the weather, climate and rain that each biome had. The teacher answered learners' questions through examples in view of the weather of different

parts of South Africa. The teacher gave the learners a homework which was written on the board. Part of the assessment was to define biomes, climate; weather and to mention different biomes found in different provinces of South Africa. Thereafter, the period ended and the learners left the class. The researcher assumed that they were going to another class because they had been complaining about being late. The teacher remained in front holding chalks and seemed worried about the ending of the period. Seemingly, he wanted to continue with the lesson.

Lesson 2: Tools and the equipment used for the practical lesson

On the researcher's second visit to the school, he arrived after break and used the second period after break. This time around the teacher was using a grade 12 class for practical conduction. This practical was based on identifying different types of animal feeds. Learners were seated in groups of three. The teacher indicated to the learners that since there were no resources to perform the practical, they would have to use pictures to conduct the practical. Each group had eight pictures which showed various animal feed such as hay, silage, urea, biuret, minerals, sunflower oilcake and many more. Each group also collected a pie chart, glue stick, scissor and a marker. After assembling all the required tools for the practical lesson, the teacher asked the learners questions which were difficult for the researcher to tell whether they were meant for the practical or theoretical component. Learners started discussing in their groups as the teacher sat down. They were talking about the different types of feed for animals. They also discussed the manual provided to them with various types of animal feed. They went further to put two papers written 'concentrate and roughage', and continued reading the manual and debating on how to classify them. The teacher remained seated throughout the lesson, while the learners were busy moving around assembling the tools to be used for the practical lesson. The teacher only stood up to distribute handouts of the assessment. The teacher then sat down and focused on his cellphone until the period was over and the learners left the classroom.

Lesson 3: Practical Lesson Taking Palace (Classification of different types of animal feeds)

On the researcher's third visit, the practical lesson took place during period two before break. The researcher went to the classroom with the teacher and learners were found seated in their groups. The teacher did not explain anything to the learners. After

greeting them, the learners started their practical work holding the PAT document, which was used as a guidance for the practical. Each group started cutting out pictures from the big document given to them that had different feeds and pasting them on the pie chart based on the types of feeds assigned to the groups. During this time, the teacher was seated down with documents on his table. The teacher neither stood up nor moved around to monitor the learners' works. After 40 minutes, the learners were done with the practical lesson. The teacher started assigning the learners questions individually so that they could go and write at home and said that they must submit the next day in their activity book. The teacher then dismissed the class but the learners did not leave the class; they continued talking until the researcher and the teacher left them there.

Based on the researcher's observation of **Teacher E**'s class, learners were on their own during the practical lesson. The teacher neither explained nor moved around to monitor and support the work done by the learners like **Teacher B** who moved around during the practical lesson. Seemingly, this teacher had more content knowledge, but could not transfer it effectively to the learners. Hence, the learners appeared confused. At some point, it was unclear what the teacher was saying. The teaching approach was not learner-centred. **Teacher E**'s teaching strategy was similar to that of **Teacher A**. In fact, their lesson plans were structured in the same manner. However, **Teacher A** was a little bit faster in teaching. All Agricultural Sciences teachers that participated in the research did not explain to the learners how the practical component must be conducted. They all failed to finish the content meant to be covered during the theoretical lesson. Their lesson plans were structured the same. Regarding the arrangement of the components of the lesson plan, they all performed differently.

4.2.2 Field notes analysis

During the researcher's observation of both the theoretical and practical components offered by Agricultural Sciences teachers, he took some notes to account for the reasons behind the teachers' presentation of lessons in a certain way. Moreover, field notes were taken to understand the experiences and challenges faced by Agricultural Sciences teachers during lesson planning and in teaching theory and practice on the subject.

4.2.2.1. What are the challenges faced by Agricultural Sciences teachers during practical lessons?

The researcher noted Agricultural Sciences teachers are not updated with innovations in the subject and industry dynamics. With the advent of new scientific findings, technology, and practices, the agricultural industry is always changing. It was difficult for teachers to keep up with the most recent developments in biotechnology, precision farming, and sustainable agricultural methods. The need for ongoing professional development cannot be overstated, despite the possibility of being hampered by the lack of funding, time, or limited training opportunities. In the absence of the foregoing, there were poor lesson plan structures and this affected how lessons were supposed to be conducted. It was noted that the teachers lacked the requisite Agricultural Science knowledge, skills and abilities during the theoretical and practical teaching. This was seen when the teachers explained some subject content using irrelevant examples, which caused confusion among the learners.

Agricultural Sciences teachers also worked in poor infrastructure, where there was minimal access to resources, and inadequate field and laboratory equipment. All of the participating schools had insufficient space, equipment, and laboratory necessities for the practical component of the subject. The teaching strategies for almost all the Agricultural Sciences participant teachers were either a lecturing method or a teacher-centred approach. This type of teaching did not offer the learners an opportunity to fully participate in the lesson. The teachers struggled to get some of the equipment to be used during the practical lesson. Grade 10 learners' practical lesson entailed checking different soil textures in three types of soil samples, which were silt, clay and sand soil. **Teacher A** said this regarding the session: "*It is very difficult to attain some lesson objectives of some practical's due to shortage of resources, if you can check we don't even have agricultural laboratory where we can store our sample and all required tools for all practical of the subject*". Similarly, **Teacher C** said: "*The availability of the teaching and learning resources affects how well the initiatives of the lesson turn out during the teaching and learning of Agricultural Science theory and practical*". The researcher noted that due to a shortage of Agricultural Sciences teaching and learning resources, teachers often wind up eliminating activities from their lesson plans, which affects how the lesson should be conducted. From the

researcher's notes, it may be said that not all of the learning goals will be met in these poorly resources schools. Learners who lack teaching and learning resources for Agricultural Sciences do not learn well because of the changes in the lesson plan owing to the lack of resources.

The researcher noted that due to the shortage of teaching and learning resources, the selected schools perform poorly in Agricultural Sciences. During the practical lessons, some learners were missing some steps due to the shortage of resources needed for the practical lesson. Noteworthy, the teachers had insufficient skills and knowledge to conduct practical lessons, which explains why they did not help the learners on how to conduct practical.

4.2.2.2 The use traditional teaching method in Agricultural Sciences subject

Due to the shortage of teaching and learning resources such as textbooks, learning aids and practical materials such as laboratories led to the use of the traditional teaching and learning method. The researcher noted that it might have brought a lot of confusion to some learners. The researcher noted that the method was not user-friendly to learners and led to the failure in understanding the basics of the subject. Modisenyane et al., (2004) obtained similar results about the use of traditional teaching method. Teachers' employment of conventional teaching and learning approaches in the Agricultural Sciences is frequently impacted by a confluence of institutional, practical, pedagogical, and cultural variables. While there are benefits to using traditional techniques in Agricultural Sciences, teachers should also think about implementing innovative, cutting edge teaching strategies that use technology, creativity, and interdisciplinary views to improve learners' outcomes in Agriculture Sciences, especially in the practical session. On the teaching method, **Teacher D** had this to say: "*You see Agricultural Sciences is a vocational subject where learners learn best by doing, so myself as a teacher I just need to facilitate and direct learners, but the rest they need to be doing it themselves since this subject is a vocational one*".

The researcher noted that traditional methods and knowledge transfer have a long history even in the teaching of Agricultural Sciences. Agricultural traditions have been handed down through the generations in various cultures through the use of hands on learning, oral storytelling, and apprenticeships. Due to these approaches' cultural

relevance and sometimes effectiveness, teachers still use them. **Teacher E** said: "*Agricultural Sciences is a practical field that frequently calls for expertise and practical abilities, but with us it is difficult as we don't have necessary equipment for this subject, he further said that I am forced to use this traditional teaching method even though majority of you seems to be not in support of it".* It was noted by the researcher that some learners were not comfortable with the method used in the classroom. In some schools, the teacher had to write notes on the board and try to explain the notes without learners referring to the handouts. Due to the shortage of textbooks and lack of technology to use during teaching and learning, the teacher had to use the traditional method of moving around the classroom showing learners pictures in the textbook.

4.2.2.3 Novice teachers compared to experienced based on the teaching and learning resources availability of Agricultural Sciences

The researcher noted that novice Agricultural Sciences teachers got bored, had less interest in the subject and were discouraged to work in schools with insufficient teaching and learning resources compared to experienced teachers. Kabugi (2013) has obtained similar results about novice teacher about losing interest in teaching and learning due to shortage of teaching and learning resources. Hence, novice **Teacher A** said that: "*Lack of institutional support, restricted finances, and insufficient access to technology and lab equipment as reasons for her difficulties in finding teaching and learning materials in the Agricultural Sciences, this lead to the wrong way in which subject must be taught. As a teacher I have to make a plan to teach that section even if I don't have enough teaching and learning resources to be used in that section".* Conversely, **Teacher E**, an experienced teacher in Agricultural Sciences, said: "*I often had better access to resources because of my built in networks, institutional support, and body of acquired professional expertise in the subject*". The researcher noted that more experienced Agricultural Sciences teachers are better at making the most of the resources at their disposal. During the researcher's observation of the practical lesson offered by inexperienced **Teacher B**, it was noted that these teachers need access to contemporary resources. New teachers frequently relied on more conventional teaching strategies such as lectures, and textbooks in Agricultural Sciences. The researcher also noted that the practical component of the subject was crucial for Agricultural Sciences learners. Furthermore, teaching and learning at a school with

limited resources is quite expensive, and creating a lesson plan that meets every demand of the learners requires time and effort. Thus, to be an excellent teacher in a school with limited resources requires a lot of dedication, financial support, and sacrifice. Furthermore, the situation is dire in schools situated in rural areas, especially schools that are less inventive, which results in most learners lacking academic ambition, and therefore difficult to teach them.

4.2.2.4 Teaching and learning of Agricultural Sciences practical in the classroom or laboratory

The researcher noted that carrying out experiments in a classroom requires an engagement with the learners who must observe and comprehend what is happening. In view of this, **Teacher D** said: "*It may be difficult to keep all of the learners engaged, motivated, and involved in the session at times. I'm always having to improve on classroom control. I see classroom engagement as a two-way street, which means that although I teach the learners and direct their cognitive learning processes, the learners also need to participate in the process of creating knowledge through discussions and answering questions raised amongst themselves".* The teaching and learning process made it clear that, for learners studying Agricultural Sciences in grade 10 to understand scientific concepts to the best of their ability, teachers must properly explain the concepts to them. The researcher noted that every learner has a unique interpretation of what they see, and to comprehend the ideas, they must use critical thinking skills. The researcher also considered experiments as helpful in the conduction of practical activities. Moreover, learners' participation in the classroom is a two-way street, meaning that although they are guided by their teachers, their cognitive learning processes must also be equipped for knowledge creation by contributing to debates and answer key questions in the practical lessons of Agricultural Sciences. Swan & Burkhardt, (2014) has also noted though the study that practical need more explanation by teacher to learners in order to reduce confusion.

4.2.2.5 Challenges faced by Agricultural Sciences teachers during the teaching process of theory in the classroom

All the teachers used extremely insufficient resources to introduce learners to new areas of knowledge and provide them with the opportunity to incorporate new information into what they already knew. All the teachers taught Agricultural Sciences

using textbooks and previous examination question papers. A majority of teachers were more at ease with textbooks than they were with other useful resources such as simulations, videos, and charts. As a result, most teachers were unable to instruct learners and improve their comprehension through the use of a range of resources. Eliot (2003) asserts that an efficient use of instructional tools in the classroom, such as simulations and movies, improves learners' comprehension of the material and helps them to demonstrate how to apply it in various contexts. All the teachers followed the teaching and learning included in the CAPS document during the researcher's observation. Some Agricultural Science teachers were using rubrics to allocate marks to learners, mostly the practical part. While most teachers had a complete PAT document, they seldom made copies for learners during the practical lessons. It is crucial that learners view the whole set of PAT guidelines so that they consistently consult them and avoid deviating from the real assessment. During the document analysis of the lesson plans, it was noted that the teachers did not give the learners feedback on how they performed in their assessment.

Overall, what hindered the theoretical teaching and learning of Agricultural Sciences across the board was limited resources, which limited the teachers' ability to provide skills and knowledge during teaching and learning. The main problem was the shortage of textbooks and practical handouts for the learners to use in the classroom. To the researcher's knowledge, aspects from a variety of academic fields, including the life sciences, chemistry, ecology, and economics, could be integrated into Agricultural Sciences. To teach these interdisciplinary concepts, teachers must possess a thorough grasp of several different areas and the capacity to explain how those subjects interrelate in agricultural situations. However, it was observed that the teachers lacked skills of contextualising these interrelated disciplines in the classroom. Another observation was among all Agricultural Sciences teachers, there was a struggle with time management. For instance, when the period ended, all the teachers were still eager to continue with the lessons. Some were even shocked that the time had elapsed.

4.2.3 Document analysis results

Teacher D

To understand the challenges faced by Agricultural Sciences teachers when planning and presenting theoretical and practical lessons, a document analysis of the lesson plans prepared by the teachers had to be done by the researcher. Both theoretical and practical lesson plans were critically analysed by the researcher to gain an in-deep understanding of the different aspects of lesson plans, including the challenges faced by teachers and how they affected learners' academic performance. Two lesson plans from Agricultural Sciences teachers were analysed during data collection.

Agricultural Sciences teachers' lesson plans

It is imperative that teachers prepare their classes in advance using a lesson plan. It enables teachers to cut down on time wastage while concentrating on the main ideas of each class (Taylan, 2018). The study also investigated whether or not Agricultural Sciences teachers prepared lessons for theoretical and practical classes. Although all Agricultural Sciences teachers used for this study had lesson plans for their classes, they all acknowledged that putting them into practice took time. As required by the National Curriculum Statement (RNCS, 2002), it became clear from the observations made in the classroom that the teaching and learning approaches involved a certain level of learner engagement. When evaluating a lesson plan for Agricultural Sciences, it was important to look at all of its components to determine how well it aligned with the standard of a lesson plan proffered by DBE. Below is a summary of the topics checked during the document analysis of the lesson plans used by the sampled Agricultural Sciences teachers.

Learning objectives and outcomes

The researcher noted that the lesson plans had some lesson objectives, but at some point, it was difficult to attain those objectives due to the shortage of teaching and learning resources such as textbooks and practical materials. The subtopics of the lesson were not well organised or put in a chronological order. The content coverage corresponded with the pace-setter of the teaching and learning school term. Some teachers did not have clear lesson objectives that could be attainable during teaching and learning. Some lesson objectives were not well-constructed or were not aligned with the CAPS document. Few lesson plans were clearly giving the picture of how the lesson would be constructed during teaching and learning. On other problematic factor was the time allocated per period, which was 45 minutes. It sometimes hindered the

attainment of lesson objectives. Suffice it to say, learners need enough time to participate in the practical session. Time constrains hinders the process of teaching and learning in Agricultural Sciences mostly the practical sessions which requires more time (Hainline & Smalley, 2019).

Content coverage

The researcher discovered that the time allocated to each period is not enough for the teaching and learning of Agricultural Sciences. The time allocated to the practical lesson was not enough as well, but it was better than the time allocated to the theoretical component. Hence, all the participant teachers wanted more time to complete the content of their lesson plans. The learners also needed more time to ask questions and to participate in teaching and learning. To determine whether the lesson plan covered a wide range of topics related to Agricultural Sciences, such as plant science, soil science, animal husbandry, agricultural economics, and sustainable agriculture practices, the researcher examined the content and found that it was entirely pertinent. The content's accuracy, timeliness, and appropriateness for the target audience or grade level were other factors the researcher had to take into account.

Teaching and learning strategies

The researcher examined the instructional strategies employed in the lesson plan and discovered that it was a teacher-centred approach, where the teacher dominated the lesson. If there were opportunities for hands-on learning experiences, such as experiments, fieldwork, or farm visits, the lessons would be beneficial to the learners. Moreover, if the activities promoted inquiry-based learning, critical thinking, and problem-solving skills, for instance, the learners would be better equipped in the subject. Lastly, the researcher explored whether the teaching strategies effectively engaged learners and fostered a deeper understanding of agricultural concepts, and found that the lesson plans teaching strategies. All the participants used a teacher-centred approach, which hardly encourages learners to be engaged in the learning process. Teachers dominated all theoretical lessons. Learners without the participation of the teachers dominated only practical lessons.

Differentiation in the lesson

The research evaluated how the lesson plans addressed the diverse needs and learning styles of learners during teaching and learning. The lesson plans never accommodated learners with various learning strategies, as they were teacher-centred. Similar results were produced by Hoffman (2013), indicated that most lesson plans for teaching and learning does not accommodate learners.The accommodations of learners with varying abilities, interests, or backgrounds, the teaching and learning of Agricultural Sciences at the selected schools would have been highly effectively. Lastly, the researcher also considered whether the lesson plans included strategies for scaffolding learning, providing enrichment opportunities, or supporting English language learners, but the researcher found that the lesson plans were not accommodative to all learners.

Learners' assessment activities

The researcher investigated if and to what degree did Agricultural Sciences teachers provide learning activities to their learners. A majority of teachers provided learning activities at least once a week, according to the data. Most of the tasks assigned to learners were derived from previous test or examination question papers. This was consistent with the claim made by Huang and Chiu (2015) that learners learn more when they actively engage in the learning process, whether it be through assignments, homework, discussions, practice, review, or application. Therefore, the quality of the assessment given to learners was in line with CAPS and was of a good standard. The researcher further noted that the work output was not in line with CAPS because the work was not enough to be given to learners per week. The Agricultural Sciences policy document says that learners must be given four assessments per week.

Assessment methods

The Agricultural Sciences lesson plans' assessment procedures were examined by the researcher. The researcher measured learners' comprehension of Agricultural Sciences ideas and abilities, which were found to be aligned, and checked to see if they matched the learning objectives. Additionally, the researcher persisted in evaluating the authenticity and variety of the assessments, which included oral presentations, project-based evaluations, and performance tasks. The researcher's last investigation concerned whether formative evaluation may be used to track learners' progress and give timely feedback. Therefore, the teacher gave learners

assessments in the form of homework, classwork and group discussions, which is supported by the Department of Education's policy document. Thus, the teacher did well on this aspect. The teacher did have knowledge of how assessment must be conducted, but concerning the application thereof, the skills were not enough. The teachers' lesson plans did not stipulate the nature of assessment for the learners. Only group work was used to assess the learners.

Integration of technology

The researcher also looked into how technology is included into the lesson plans of Agricultural Sciences for application in the teaching and learning process. It was discovered that although the lesson was well-suited for integration, it was not implemented due to a shortage of technical resources for that lesson. The researcher also further investigated the potential of digital materials, simulations, or online tools in augmenting the learners' Agricultural Sciences education. Technology's ability to encourage participation, teamwork, and creative exploration of agricultural ideas was another factor that the researcher took into account. However, the lesson plans never included anything that integrated the lessons with technology, and this was due to the limited or shortage of teaching and learning resources in Agricultural Sciences.

Alignment with standards

The lesson plans were found to be well-aligned and compliant with pertinent educational standards and curricular frameworks for Agricultural Sciences. The researcher also sought to find out if the assessments, content, and learning objectives matched state, federal, or worldwide requirements for Agricultural Sciences scientific education. The lesson plans' effectiveness in getting learners ready to fulfil the goals of Agricultural Sciences was assessed by the researcher. The researcher found that all was well in terms of alignment with the Departmental of Education's policy standard.

Policy PAT document

Practical assessment task policy papers are official materials provided by the Department of Basic Education to teachers to help learners with their year-long practical tasks in Agricultural Sciences. All the teachers who conducted their practical lessons had the document that they used to guide the learners during the lesson. This paper outlines the type of practical that each learner should do and breaks down the

tasks that need to be completed in each term by Agricultural Sciences learners. It also specifies what will be evaluated and how that will be done by teachers and learners during the teaching and learning process. The researcher noted that indeed the document was utilised by all the teachers during the learners' hands-on projects. The document contains all necessary information required for the practical assessment in Agricultural Sciences. Therefore, all Agricultural Sciences teachers used an up-to-date PAT document for their practical lessons and used it correctly to guide the learners on how to conduct the practical lessons.

Overview of the Lesson Plan

The lesson plan was well drafted for the grade 11 class. The topic of the lesson was Basic Agricultural Chemistry. Three lesson objectives were well stated and clear for the lesson. The lesson targeted Agricultural Sciences learners in grade 11 for them to obtain skills and knowledge of the subject. One hour was allocated for the lesson during teaching and learning, and the content corresponded with the pace-setter of term two. Minor challenges were observed regarding the teaching method, which was excluding learners' participation. The time allocated to the lesson was not used effectively.

Contextual Background

Agricultural Basic Chemistry is taught in grade 11 to enable the learners to always link the chemicals used in the farming industry. Learners need this knowledge to understand the different products that can be used for animals and plants in agricultural industry (Hoffman, 2013). Since most fertilizers are chemicals and numerous chemicals are used to control different parasite and insects, this makes this topic to be relevant for the subject. The curriculum intends to equip learners with necessary skills and knowledge which can be used in the future.

Resources and Materials

It was noted that the resources and materials listed on the lesson plan were mainly previous papers and laboratory practical tools. All the provided materials were appropriate for use by the learners even though there were some chemicals such as iodine solution on the list, but the school did not have. The chemical was meant for testing the availability of the starch in the leaves for the first practical of Agricultural

Sciences in grade 11. The topic of the second practical lesson was determining the soil structure, texture and colour. The lesson plan clearly stipulated that learners needed to take clear caution while working in the laboratory.

Teacher C

Agricultural Sciences teachers' lessons plan

It is imperative that teachers prepare their classes in advance using a lesson plan. It enables teachers to cut down on time wastage while concentrating on the main ideas of each class (Taylan, 2018). It was also investigated whether or not Agricultural Sciences teachers prepare lessons theory and practical classes. Although all Agricultural Sciences teachers in this research had lesson plans for their classes, as required by the National Curriculum Statement (RNCS, 2002), but they all acknowledged that putting them into practice took time. It became clear from the observations made in the classroom that the teaching approaches did involve learner engagement. During the evaluation of lesson plans by Agricultural Sciences teachers, the researcher looked at all the components to determine how well the plans supported teaching and learning. Below is a summary of the topics checked during the document analysis of the lesson plans from **Teacher C**.

Learning objectives and outcomes

The lesson plans were clear and understandable to the researcher. The lesson plans had four objectives and all of them were attainable because they did not want more resources. They just needed previous examination papers and a textbook, even though numerous studies stipulated that it is sometimes difficult to attain all lesson objectives due to the shortage of teaching and learning resources. However, for this lesson, the researcher noted that all the lesson objectives had been attained. The one-hour 30 minutes lesson for the theoretical component was enough for the lesson to be completed. Two Agricultural Sciences teachers used one-hour 30 minutes for the theoretical lesson, which was enough to cover the content. Nevertheless, other teachers were given 45 minutes in one period for theoretical lessons. Lesson plans outcome in teaching and learning must have lesson objectives that are compatible with teaching method in order to obtain good outcome (Buruchara et al., 2013).

Content coverage

The teacher had enough time to cover all the content components mentioned in the lesson plan since the period was 1hour 30 minutes. The researcher noted that more time was needed for the theoretical lesson since during teaching and learning, learners needed more time to ask questions and sought for clarity, which could not be accommodated in the 45 minutes lesson. To determine whether the lesson plan covered a wide range of topics related to Agricultural Sciences, such as plant science, soil science, animal husbandry, agricultural economics, and sustainable agriculture practices, the researcher examined the content and found that it was entirely pertinent (Yildirim, 2003). The content's accuracy, timeliness, and appropriateness for the target audience, Agricultural Sciences learners, was considered by the researcher during the document analysis of the lesson plans.

Teaching and learning strategies

The researcher examined the instructional strategies employed in the lesson plan and discovered that it was a teacher-centred approach where teacher dominated the lesson. However, there were opportunities for hands-on learning experiences, such as experiments, fieldwork, or farm visits, which were given to the learners in some schools. If the activities promote inquiry-based learning, critical thinking, and problem-solving skills and all aspects, then the learners' knowledge of the subject will be enhanced. Lastly, the researcher explored whether the strategies effectively engaged learners and fostered a deeper understanding of agricultural concepts, and the lesson plan had that.

Differentiation

The research evaluated how the lesson plans addressed the diverse needs and learning styles of learners during teaching and learning. The lesson plans never accommodated learners with various learning strategies, as they were teacher-centred. The accommodations of learners with varying abilities, interests, or backgrounds, the teaching and learning of Agricultural Sciences at the selected schools would have been highly effectively. Lastly, the researcher also considered whether the lesson plans included strategies for scaffolding learning, providing enrichment opportunities, or supporting English language learners, but the researcher found that the lesson plans were not accommodative to all learners.

Learners' assessment activities

The researcher investigated if and to what degree did Agricultural Sciences teachers provide learning activities to their learners. A majority of teachers provided learning activities at least once a week, according to the data. Most of the tasks assigned to learners were derived from previous test or examination question papers. This was consistent with the claim made by Huang and Chiu (2015) that learners learn more when they actively engage in the learning process, whether it be through assignments, homework, discussions, practice, review, or application. Therefore, the quality of the assessment given to learners was in line with CAPS and was of a good standard. The researcher further noted that the work output was not in line with CAPS because the work was not enough to be given to learners per week. The Agricultural Sciences policy document says that learners must be given four assessments per week.

Assessment methods in the subject

The Agricultural Sciences lesson plans' assessment procedures were examined by the researcher, and it was discovered that most teachers focused on the classwork and homework, which were given at the end of the lesson. The researcher observed the learners' comprehension of agricultural ideas and abilities, which were found to be aligned, and checked to see if they matched the learning objectives, and found them matching. The researcher further evaluated the authenticity and variety of the assessments used in the subject, which included oral presentations, project-based evaluations, and performance tasks. The researcher's last investigation concerned whether formative evaluation could be used to track learners' progress and give timely feedback. This was not included in the lesson plan, but the Department of Education document indicates that learners must write a test in the subject and get feedback.

Integration of technology

In this lesson plan, the researcher did not find any integration of technology specifically for this lesson. The lesson was strictly inviting the use of a textbook and practical policy tasks document only. Hence, the researcher indicated that all lesson objectives were attainable because they did not need more resources to make the lesson a success. The attainment of the lessons objectives did not require the use of technology. The researcher further investigated the potential of digital materials, simulations, or online tools in augmenting learners' Agricultural Sciences education. Technology's ability to encourage participation, teamwork, and creative exploration of agricultural ideas was

another factor that the researcher took into account. It was discovered that there were lots of agricultural ideas which the teacher brought into lesson planning.

Alignment with standards

The researcher discovered that the lesson plan was well-aligned and compliant with pertinent educational standards and curricular frameworks for Agricultural Sciences. However, when the lesson plan had to be implemented, a few areas had challenges such as time allocated. Lesson objective number three could not be attained due to the teaching method used. It was also observed that the subject content knowledge was not enough from the teacher. This was seen where the teacher failed to link theory with the day-to-day realities of the agricultural sector. Lastly, the teacher seemed to be lacking the skills and knowledge to solve Agricultural Sciences problems. The researcher sought to find out if the assessments, content, and learning objectives matched state, federal, or worldwide requirements for scientific education, and realised that they were well aligned in all the necessary aspects. This was because the teacher used the document for guidance in lesson planning. The lesson plan's effectiveness in getting Agricultural Sciences learners ready to fulfil the subject competence goals was assessed by the researcher during the analysis of the lesson plan.

Policy PAT document

The practical assessment task policy papers throughout all the practical lessons guided the teacher. The policy document is an official practical resource provided by the Department of Basic Education to all Agricultural Sciences teachers to help them and their learners to achieve lesson objectives and have smooth lessons. The teacher had the policy document at hand for guidance during the lesson. All the teachers who conducted their practical lessons had the document to guide the learners in the lesson. The practical policy document mainly outlines the type of practicum that each learner should do and breaks down the tasks that need to be completed in each term. It also specifies what will be evaluated as well as how. The PAT was utilised by all the teachers for the learners' hands-on projects. The document contains all the necessary information required for the practical assessment in Agricultural Sciences from grade 10 to 12.

Teachers' overall competencies in lesson planning for theoretical and practical lessons

The researcher noted poor lesson planning among participant Agricultural Sciences teachers. This was noted through the consultation of the CAPS policy document. The lesson plan for **Teacher A** was well drafted in most components, but the lesson objectives were unattainable through the teaching and learning observed in both theory and practice. The teacher used only group discussion as a form of assessment for both theory and practice. **Teacher B**'s lesson plans had only two lesson objectives for the theory, which were all unachievable in the theoretical lesson. The lesson plans only indicated that learners would be given assessment after teaching and learning. The lesson plans did not indicate how assessment would be administered.

The lesson plans for **Teachers C** and **D** were the same regarding their assessment techniques. They both had only one lesson objective for the theory and for practical lessons. The researcher noted that the lesson objective for **Teacher D** was good and met the standard through the guidance of CAPS document. **Teacher D** gave learners an assessment in the form of a group for the practical lesson, but for the theoretical lesson, learners were given individual classwork, which was in a handout. **Teacher C** only had one lesson objective for both theoretical and practical lessons.

All lesson plans components for both **Teacher C** and **D** were fine, except the lesson objectives and assessment, which were not the one encouraged by the DBE CAPS document. The DBE requires teachers to have lesson objectives and assessment, which will always require the learners to participate in knowledge constructions. The lesson plans for **Teacher E** had two lesson objectives in both theory and practice. The teacher gave the learners various assessment forms; peer assessment was used for the theoretical lesson. However, for the practical lesson, the teacher used a group assessment. The researcher noted that only two Agricultural Sciences teachers, **Teacher A** and **E** had good and standard lesson objectives, as directed by the DBE's CAPS document. **Teacher B, C** and **D** had poorly standardised lesson plans when compared to **Teacher A** and **E**. Both teachers had drafted well other components of the lesson plan, although the only challenges were the lesson objectives and assessment forms and techniques. Based on the data collected from the lesson plans, the researcher noted that more workshops need to be organised for teachers.

4.3 RESEARCH QUESTION 2: HOW DO TEACHERS VIEW THEIR CHALLENGES WHEN PLANNING AND PRESENTING AGRICULTURAL SCIENCES LESSONS?

This research question was answered through semi-structured interviews.

4.3.1 Data collected from interviews

Semi-structured interviews were used to gain an understanding of Agricultural Sciences teachers' challenges when planning and presenting Agricultural Sciences lessons. Aspects, which were checked, included the effectiveness of using a lesson plan in teaching and learning, the effectiveness of using different resources such as textbook, their understanding of both the theory and practice of the subject and why they conducted their classes in the manner they did. In addition, to check if their classes were effective in teaching and learning. The following are the results provided by Agricultural Sciences teachers during interviews.

4.3.1.1 Why do you use a lesson plan during teaching and learning?

All five Agricultural Sciences teachers had their lesson plans for both the theoretical and practical sessions. Although all of them indicated that lesson plans waste their time and increases more work to be done, they still admitted that they had no option but to develop lesson plans, as the Department of Basic Education policy says a teacher should have a lesson plans in their files which will guide them to teach. **Teacher A** stated that for him to have a proper lesson in classroom, he does not need a lesson plan, but because of the policy of Department, he has to do it:

> *A learning programme is a yearlong phase plan, as stipulated by the departmental policy. A work schedule is a year-long plan designed for Agricultural Sciences. Every year at the conclusion of the school year, teacher we get together with the other science teachers to create a new work schedule for the next year or to make changes to an already-existing one. The work schedule is then broken down into a lesson plan, which is typed out by the Agricultural Sciences teacher each week as they get ready to teach. These plans are sent to the head of department for oversight and management, as decided upon at the school's science department. The goal is to make sure that the teacher keeps the right speed and follows the timetable for the material that is presented. So yes I use lesson plan in order to follow the pace of the content during teaching and learning.*

Teacher C said:

> *Listen here sir, lesson plan is my weapon to teach in an effective manner in this Agricultural Sciences. Using my analysis, I can tell you that lesson preparation is only a framework that serves as a blueprint for Agricultural Sciences teachers or all teachers in general, showing what happens in the classroom ahead of time. Lesson plan helps me a lot, it helps me to accomplish learning goals in the allotted time. Additionally, lesson plan provides learners with assurance of acquiring required knowledge of the subject through both theoretical and practical lesson.*

Teacher B said:

> *I can say that the way I have prepared for the lesson and the activities that I brought into class for learners to do did help them to learn, because most of them are hands-on, so it caters them for both theory and practical lessons.*

Teacher E said:

> *As for me a lesson plan outlines the goals for the allotted time. It covers the subject, learning objectives, standards for assessment, activities for both teachers and learners, resources, evaluation, and scheduling. So yes this is my description when it comes to the lesson plan and the use of it in the class preparation for Agricultural Sciences.*

A follow-up question sought to find out if the teachers knew about the template of lesson plan. They indicated that they had a departmental template which is supposed to be used by all teachers in that department. Both novice and experienced Agricultural Sciences teachers who answered this research question stipulated that an efficient lesson preparation enables them to accomplish their sessions' goals and objectives within a set time. The curriculum, as well as the general expectations of the school and teachers, are interpreted and put into practical manner.

4.3.1.2 Do you have enough teaching and learning resources to teach Agricultural Sciences learners?

Most teachers used different textbooks for teaching the theoretical and practical components of the subject, but the learners had to take notes since many school did not have enough textbooks for all learners. Therefore, only teachers have different textbooks to be used for the lesson. When asked, they responded that:

Teacher C said:

> *I can* say *sometimes is very difficult to teach learners using the textbook because when they have to refer to it, it become very difficult since learners are not having enough textbook. Is either they share the textbook or I make copies for them and mostly for graphic part only.*

Teacher A added:

> *The lack of teaching and learning Agricultural Sciences resources in schools placed teachers in a difficult situation both during lesson planning and teaching for practical and theory,* she continued *saying in order to effectively teach Agricultural Sciences learners farming knowledge and skills, some of the assessment tasks they must complete them through the use of practical's and projects which need enough equipment in order to complete them successfully so*.

Teacher E said:

> *In order to overcome these obstacles, cooperation, innovation, and adaptation are necessary. Teachers might need to work with other teachers, ask for help from the community, and make good use of the resources that are available. To ensure that Agricultural Sciences learners have a high-quality educational experience, it is also essential to advocate for more funding and resources for agricultural education.*

Teacher B proffered:

> *There may be restrictions on the use of technology in the classroom, making it harder to include dynamic and interesting learning possibilities like accessing internet materials or simulation software. As an Agricultural Sciences teacher may be forced to use antiquated teaching techniques, which would prevent learners from becoming digitally literate. Talks regarding contemporary environmental issues may need to be included in lessons, but the complexity of these talks may be constrained by a lack of resources.* (Laughing) *You see, teachers may find it difficult to offer real-world experiences or workable answers to today's agricultural problems, which might hinder learners' capacity to apply their academic knowledge in practical settings.*

The afore-mentioned difficulties were discovered through an interview, document analysis, and lesson observation. However, to gain a deeper understanding of the teachers' lesson preparation and whether their delivery went as planned, the researcher decided to interview the teachers raised probing questions. Thus, to determine the precise causes, research question number two sought to find out how Agricultural Sciences teachers perceived their difficulties when planning and delivering theoretical and practical lessons (Cohen et al., 2013).

4.3.1.3 How does this shortage of teaching and learning resources affect learners' academic performance in the subject?

Almost all the teachers indicated that the shortage of teaching and learning resources affected how the lessons were supposed to be delivered and hampered learners' performance in Agricultural Sciences. They also indicated that this was concerning and required serious remedial interventions.

Teacher B said:

> *Teachers regularly use the lecture technique because they lack the necessary resources which can support their teaching and learning process. This approach is unable to impart Agricultural Sciences necessary knowledge and skills to learners. Appropriate pedagogical strategy makes it possible for learners to comprehend key scientific ideas with ease. Learners who are taught through lectures method, has to think in acritical way as they are considered to be forming part of the knowledge construction. When active learning is encouraged facilitated in the classroom by the utilizing necessary teaching and learning tools, learners are motivated and excited to study. Basically lessons in Agricultural Sciences become impractical and boring when school farms and labs are not available.*

Teacher C said:

> *Learners become the most affected people when it comes to this aspect of the shortage of teaching and learning resources. The knowledge they acquire in the subject is not complete as most of the practical work is not fully covered. In fact, let me be honest with you, as for me, I think the affected areas when it comes to the shortage of teaching and learning resources is the practical oriented topics such as soil texture, soil acidity and so on. I'm saying this because for the content I do give them notes and make*

> *some copies, but with practical is a different story as practical is a doing part.*

Most, if not all, teachers indicated that they were mainly affected by the shortage of teaching and learning resources, which also hindered them from attaining some of the lesson objectives. **Teacher A** also indicated that this shortage of teaching and learning resources affected learners' interest in the subject. **Teacher B** highlighted that due to the shortage of resources, they ended up using a certain teaching method, which was not user-friendly to the learners.

Teacher D added:

> *The need of teaching and learning materials for the efficient teaching of Agricultural Sciences in schools has been stressed by a number of researchers. Ibrahim (2011) emphasises that a teacher's background and credentials have an impact on how they employ teaching resources to improve learners' learning during the process of teaching and learning. This leads this study to the conclusion that improvisation training for teachers in low-resource schools need to be a part of teacher preparation programs, so that those teachers can learn different ways to deal with the situation of lack of teaching and learning resources. Furthermore, if Agricultural Science teachers can receive in-service training, making the most of the limited resources at their disposal may help schools solve their current issue about shortage of teaching and learning resources. But people who are mostly affected are learners when it comes to getting good marks and necessary skills for the subject.*

Teachers E said:

> *To be honest this is a worrying fact, this is completely killing the confidence of our learners, you find learners sharing a textbook and when I give them homework is a problem. But to answer your question learners' academic performance are compromised and affected. They get low marks because we don't have resources which the subject must have to allow smooth teaching and learning of the subject. When it comes to the practical this is worse. And let me tell you, this also affect the choosing of the subject by majority of these learners in grade 10.*

While answering the question, all Agricultural Sciences teachers said they had stressed that people who are mostly and directly affected by this problem of the

shortage of teaching and learning resources were the learners. Due to this low academic performance, these learners end up losing interest in the subject and this affects other learners who are still coming in to choose the subject. The findings of the study in agreement with the one discovered by Bonnen, (2019).

4.3.1.4 What are the difficulties you face during teaching and learning of Agricultural Sciences?

Agricultural Sciences teachers who participated in answering this research questions highlighted several obstacles they faced during the teaching and learning process. In their responses, they said the following:

Teacher A:

> *What I can say is that as an Agricultural Science teacher I face various challenges on a daily basis which include inadequate time allocation, lack of a school farm for practical purposes, overcrowding in the classroom, outdated or non-existent farm tools and equipment, poorly equipped laboratories, unsupportive attitudes from some school management team who oversee the Agricultural Sciences teachers. Lastly, the shortage of teaching and learning materials in the cooperating school. And let me be honest with you, we as public school we suffer a lot when it comes to the issue of resources.*

Teacher B:

> *I can say this without any fear or favour that there are lots of pedagogical issues facing Agricultural Science teachers during classroom teaching and learning, which includes, unfavourable classroom environments, difficulty creating lesson plans, an inability to divide topics into teaching units, difficulty in selecting appropriate teaching methods, a lack of teaching aids, and difficulties selecting appropriate teaching aids. I'm emphasizing to you that pedagogical obstacles such as lack of teaching and learning resources, lack of funds for the subjects and many more have been a common issue for several new teachers in their early years of the teaching profession. Lesson planning is typically a challenge for new teachers. This problem frequently results from teachers' incapacity to distinguish between relevant material that should be sufficient for a single class time do you get this?*

Teacher D:

As for me my man wide range of backgrounds and learning styles of learners is a huge challenge. It is not that easy for me to adapt their teaching strategies to adequately address the requirements of all learners in classes that included learners from different socioeconomic origins, cultural experiences, and academic levels. This variability frequently necessitated creative teaching strategies and tailored assistance, which needed more time and money. Lack of opportunity for professional development is a hindrance to improving my pedagogical approaches. Finally found it difficult to keep current on best practices, emerging technology, and pedagogical breakthroughs pertinent to Agricultural Sciences teaching in the absence of seminars, conferences, or specialised training programmes.

Teacher E:

Eish, here there is a very serious problem I can tell you now, inadequate teaching and learning resources is one of the main problem for me. This includes a lack of labs for the subject, textbooks, and resources for hands-on experiments. The lack of teaching and learning resources for our district Capricorn South is huge problem for all teachers of Agricultural Sciences. One of the biggest challenges to enabling effective teaching and learning in Agricultural Sciences has been is the funding limitations. The restricted funds allotted for completing research projects, planning field trips, and upgrading instructional materials have frustrated many of us teachers. This restriction made it more difficult for many of us to keep up with developments in the industry and give learners engaging experiences.

The teachers expressed their challenges during the teaching of theoretical and practical lessons in Agricultural Sciences. However, most of them noted the shortage of resources as hurdles and proffered that opportunities to attend seminars will allow them to equip themselves with subject content and teaching strategies.

4.3.1.5 Do you think it is important for a teacher to use a lesson plan during the teaching and learning process for both theory and practice in Agricultural Sciences?

It was important for the researcher to find out how Agricultural Sciences teachers saw lesson plans before teaching in the classroom for theoretical and practical lessons.

Agricultural Sciences teachers had their own views on the vitality of lesson plans in the teaching and learning process.

Teacher B:

> *As for me the lesson plan plays a crucial role in guiding both theory and practical lessons. The teacher and learners are controlled and guided by the lesson plan on what to do during the teaching and learning process. But, eish it just need more time and as teachers we have lot of work do and mostly are the paper work, so it is a huge work for me and majority of teachers to make a lesson plan on a daily basis.*

Teacher C:

> *At this point I find it important to be used in teaching and learning of Agricultural Sciences. The reason I'm saying this is because I'm a young teacher who still need experience in this subject. But eish…...this lesson plan thing has more work to be done.*

Teacher D:

> *It saves time during the teaching and learning. It also makes the lesson to have a shape to be followed during the teaching and learning. It also assists in not diverting from the topic to be taught. But no no no….it cost me my time man.*

Teacher E:

> *(Laughing) Listen to me and carefully, I am just doing it because the departmental policy requires me to do so. But I don't need it at this stage of my teaching. I know almost everything to be taught without even writing it before going to classroom. But to be honest if you're a new in the industry that can help you.*

In responding to the importance of using a lesson plan in teaching and learning of Agricultural Sciences theory and practical lessons, all Agricultural Sciences teachers indicated that it is helpful to have a lesson plan pre teaching. However, some they complained about the lack of time to enact the lesson plan. These finding is in agreement with the study by Dyer & Osborne, (2012).

4.4 RESEARCH QUESTION 3: WHAT ARE THE EXPERIENCES OF TEACHERS ON PLANNING AND PRESENTING THEORY AND PRACTICAL LESSONS IN AGRICULTURAL SCIENCES?

This research question was answered through semi-structured interviews. The main reason for using this data collection instrument was to document teachers' experiences of affected people who were Agricultural Sciences teachers. To understand the challenges and experiences faced by teachers during lesson planning and presenting theory and practice, interviews were administered during data collection.

4.4.1 Semi-structured interview data

Interview questions were given to Agricultural Sciences teachers so that they can have an opportunity to explain challenges and experiences they had in the subject when it comes to Agricultural Sciences during lesson planning and presenting theory and practical lessons.

4.4.1.1 What are your elementary Agricultural Sciences perception about lesson planning pre teaching theory and practical?

When asked about lesson plans and their efficacy, five Agricultural Sciences teachers with varying degrees of experience in the subject acknowledged that they understood the value of lesson plans for both teaching and learning. They had the following to say:

Teacher A:

> *For me the lesson planning is essentially a blueprint that shows what has to be done in the classroom within a set amount of time. Mhhhh…as a teacher it is easy for you and may easily accomplish your teaching and learning objectives with the aid of this guidance of lesson plan.*

In a similar vein, **Teacher B** said:

> *Lesson plans are an essential tool for me as an Agricultural Sciences teacher because they function as a kind of road map, helping me and learners to accomplish our goals within allotted time frames of Agricultural Sciences. But general for me as a teacher I also utilise lesson plans to organise myself before and during teaching and learning of theory and practical.*

Teacher C:

> *The lesson plan gives me confidence to stand in front of the class confidently. Planning allows me to consider every scenario for a successful session, which also helps me manage my time wisely during teaching and learning of Agricultural Sciences in both theory and practical. But to be honest my brother I have already mastered what to teach these learners*… (laughing), *I'm sure you get what I'm saying.*

Teacher D:

> *Creating lesson plans had helped me a lot and I become more adept at organising my time and material independently of Agricultural Sciences. Additionally, planning gives me the chance to consider a range of strategies for keeping learners engaged in various activities of Agricultural Sciences, it aids in their ability to envision and establish a learning environment in the classroom.*

Similarly, **Teacher E** said:

> *Effective lesson planning means a detailed guideline which I develop for every Agricultural Sciences and other subject class I teach by keeping in mind the topic, learners previous knowledge, the available teaching aids, and my own teaching methodology. Having a lesson plan provides me the assurance of what I needs to teach Agricultural Sciences in an effective way which benefits learners at the end of the lesson.*

Some teachers indicated that through lesson planning, they do not waste their classroom time, which was the philosophy **Teacher D** employed. **Teacher D** went on to say that, in his opinion, lesson planning is a lot like being a hunter. A hunter has to always have a weapon to complete his or her mission successfully. A teacher can succeed in their teaching and meet their goals if they create a lesson plan that is straightforward. All the teachers considered the goals of the syllabus as a whole, their own teaching style, the prior knowledge of the learners, and the resources or teaching aids at their disposal as they plan in the subject. They agreed that a lesson plan aids in their self-organisation, efficient classroom management, and ability to engage learners in meaningful activities throughout classroom of Agricultural Sciences. One teacher further indicated that he felt lost if he did not bring his lesson plan to the classroom for teaching and learning Agricultural Sciences. He also highlighted that he struggled with classroom management since he had no control over the questions and

answers learners ask during class. Therefore, lesson plans are crucial for teachers to teach successfully, according to participant **teacher E.** Similar results has been presented by Jolyet al., (2016) which stated that lesson plan acts as a skeleton for the lesson and it guide both teacher and learners on what do in a classroom. The study findings agrees with the one by Boikhutso, (2010).

4.4.1.2 Why do you use different teaching and learning approaches in Agricultural Sciences?

To answer the research question about the challenges teachers face during lesson planning and teaching both theory and practice in Agricultural Sciences, the researcher asked the teachers to share their views using interviews. Teachers shared their views and challenges about the subjects. In response, the teachers said:

Teacher B:

> *I first attempt to find out what they already know, then I try to explain it using concepts from science and introduce new ones. They converse in groups most of the time to improve their comprehension of science information. When I plan a lesson for the classroom, I attempt to consider my learners and ask myself, what can they possibly come up with? The materials I'll need for the classroom ought to be accessible and simple to obtain. In the Agricultural Sciences classroom, the teacher- learner dynamic is heavily influenced by the learners' cognitive capacities and behaviours.*

Teacher C:

> *In order to get learners interested in the Agricultural Sciences teaching and learning, farming, environmental science, and related subjects, as an educator I need to employ a range of techniques and approaches known as teaching and learning methodologies in the Agricultural Sciences. These methods aim to improve comprehension, stimulate critical thinking, and promote the useful application of information in authentic settings. Here is a thorough breakdown of some typical teaching and learning strategies employed by teachers in the field of Agricultural Sciences: Practical Education: Practical, hands-on activities including fieldwork, laboratory experiments, and farm visits are frequently a part of Agricultural Sciences coursework.*

Teacher D*:*

> *Learners may engage directly with the material, acquire useful skills, and comprehend agricultural topics more deeply via hands-on learning. There's is an inquiry-based learning, this method pushes learners to conduct independent research, pose questions, look into issues, and come up with answers. In order to develop learners' critical thinking and problem-solving abilities, as a teacher it assist learners in developing research topics, carrying out experiments, and interpreting results of projects and assignments. Creating strategies for environmental protection, inventing sustainable farming methods, or coming up with creative solutions to challenging agricultural issues are some examples of projects.*

It was noted that Agricultural Sciences teachers approached the subject areas differently and employed a variety of teaching strategies. Before introducing a new topic, the teachers first ascertained what the learners knew to make a connection between prior knowledge and the new information that they will learn in class. The Agricultural Sciences curriculum places focus on this particular strategy.

4.4.1.3 What are the factors that may lead to the failure to meet curriculum objectives at some point during teaching and learning?

The teachers highlighted different factors that made it difficult for them to achieve curriculum objectives during the teaching and learning of Agricultural Sciences. They had this to say:

Teacher B:

> *Restricted tool access can impede learners' ability to build real-world skills and lessen the impact of experiential learning. Financial restrictions may make it more difficult to plan field excursions, purchase instructional materials, or invite guest lecturers all of which are crucial for a thorough agricultural education. Agricultural Sciences may be forced to use more conventional teaching strategies, depending more on theoretical understanding than on real-world experience. Lesson preparation and delivery may stagnate if teachers don't use cutting edge techniques and up-to-date knowledge. It's possible that antiquated teaching methods don't successfully engage pupils, which will lower their drive and enthusiasm in learning Agricultural Sciences.*

Teacher D:

Thus, in my opinion as Agricultural Sciences teacher inadequate teaching and learning resources make it difficult to plan and teach Agricultural Sciences effectively, which occasionally results in learning objectives not being met and badly affect performance in the subject. Lack of teaching and learning Agricultural Sciences resources prevents learners from acquiring the fundamental information and skills required to advance their education in postsecondary institutions.

Teacher E:

To answer your question I will emphasise the significance of teaching a subject like Agricultural Sciences as a vocational subject in order to enable learners to study to the best of their abilities. This type of teaching and learning of Agricultural Sciences, not compromising anything, but allows both theory and practical for teaching and learning to take place can produce learners who will be independents and create their own jobs in future. This can lead to boosting the South African economy to grow fast. Without a doubt, a lack of resources may have a big influence on how Agricultural Sciences are planned and taught. It may be necessary for teachers to schedule classes around the availability of supplies and equipment.

In response to the research question on the challenges that Agricultural Sciences face when planning and presenting lesson, most teachers highlighted that the lack of support from the Department of Basic Education was one of the key challenges they faced. Furthermore, the lack of teaching and learning resources such as textbooks, practical and laboratory resources in the schools at the Capricorn South District compounded the teachers' challenges. Some teachers stipulated that they needed an ongoing content workshop, which would strengthen their knowledge in the subject. The prevalence of the foregoing challenges leads to their failure in attaining some lesson objectives, which ultimately affects learners' academic performance.

4.4.1.4 Do you think that Agricultural Sciences will still be interesting in the next coming years in the teaching and learning fraternity?

It was important for the researcher to understand the teachers' views regarding the future of the Agricultural Sciences. Their views could help the Department of Basic Education to trace the directions the subject was taking henceforth and make amendments where necessary. In response, the teachers said:

Teacher A:

> *Mr., Let me tell you the truth, Agricultural Sciences is the future of this country, in fact is the future of the world. So if the department of education can do their part and supply what they need to supplied to the schools then the problem is solved.*

Teacher B:

> *There's too much future in the subject, but the shortage of teaching and learning resources remain a challenge. The main problem here is the practical part, so yes I can say I'm seeing the subject becoming more relevant.*

Teacher C:

> *I don't have an ambition to be here in the next ten years, so for me in the next coming years the subject will be taken for granted because of the way we express it in our school level because of the resources availability.*

Teacher E:

> *Yes, I see a bright future in this subject. I would not mind to be brought back to assist the district even when I'm going to be on pension as you can see that I'm leaving the system very soon (laughing).*

In soliciting the participants' views on the future of Agricultural Sciences, the researcher noted that all the teachers highlighted that teaching and learning resources for the practical lessons remain the main problem. Only one teacher alluded that there was no future for the subject.

4.4.1.5 Do these challenges have an academic impact on the learners' results in Agricultural Sciences?

The researcher noted the responses from Agricultural Sciences teachers based on their views on the impact of the challenges faced during teaching and learning on the learners. Here are their responses to the question:

Teacher A:

> *Yes, learners are the major victims of the challenges we face as teachers. If I don't have enough teaching and learning resources that will obviously affect the structure of my lesson. It will affect how learners supposed to acquire*

knowledge during teaching and learning. For instance, when it comes to practical I rely on the pictures to do the practical due to the shortage of materials. Learners get information in a way that they were not supposed to, that is mainly due to the problems I face as a teacher.

Teacher C:

That one is an obvious case my brother I can tell you now. If I don't attend proper content workshops for Agricultural Sciences, that will lead to gap in a content knowledge. As a results this will directly affect an academic performance of my learners. Again due to lot of work I'm having, I fail to have enough time to prepare lessons for the class. Then I just go to class and read textbook (laughing) at the end, my learners will not have necessary skills required by the agricultural industry, and this also will lead to learners not have love for the subject and they can drastically fail in this case.

Teacher D:

That's a big yes Mr., this department of education does not take us serious. As a subject content disseminator, I need to have all information needed during teaching and learning of Agricultural Sciences theory and practical. So if I am not fully equipped with subject content, then it means learners are going to suffer a lot. That is why these learners at some point they lose interest in the subject is because someone somewhere is not doing the work that must be done. So learners' results are affected by this challenges I face daily. Example, I have more classes, which affected my time to be with them and know them one by one and their best learning styles.

Teacher E:

It does affect them a bit, but as I'm an experienced teacher for Agricultural Sciences, I am always making plan that they do what they should do in the subject, mostly in practical sessions. For example, we don't have enough textbook for Agricultural Sciences here in our school, but I made a guide which learners need to buy with just R30. So I always make a plan for them. But if the learner is lazy will be affected.

On the answering this question, all teachers indicated that indeed their frustrations or challenges does affect the academic performance of their learners. **Teacher B**

indicated that he always made a plan that learners received what is due to them during the teaching and learning process.

4.5 DISCUSSION OF RESULTS

4.5.1 Teachers' challenges when planning and presenting lessons in Agricultural Sciences

PAT Practical Standard as by CAPS

All Agricultural Sciences teachers followed the instructions that were included in the PAT paper while they were being observed for practical lessons. Teachers had rubrics and memoranda for controlling and marking learners' practical work. While most teachers had a complete PAT document, they seldom made copies for learners so that they could use it for reference. It is crucial that Agricultural Sciences learners view the whole set of PAT guidelines so they may consistently consult them and avoid deviating from the real assessment of the subject. This was supported by the findings by DBE (2020). Agricultural Sciences teachers just mark learners' assessments during document analysis; they do not provide helpful criticism to help learners grow and get better at their design portfolios. Since all seven subjects, including agricultural and teaching periods, are prearranged in the work plan that DBE provides, most teachers were unable to correctly identify how topics are organised. A majority of Agricultural Sciences teachers; however, found it difficult to use the materials available to them for teaching and learning of Agricultural Sciences since they solely used textbooks and past test papers for the lessons. A significant part of learners' comprehension would be played by resources provided by technological resources, such as video clips, which assisted teachers in providing certain topics in a visual manner. Teachers, however, did not share that vision.

Equipment for preparing practical lessons in Agricultural Sciences

A majority of Agricultural Sciences teachers who participated in the study were not able to set up the tools for learners to utilise during lesson observation; hence, the learners were asked to prepare practical materials on their own. Most teachers conducted hands-on sessions, even though they had not helped the learners to conduct the practical lesson. Workshops on how to use practical tools and equipment for practical sessions must be organised. All the tools were free to be used by the

learners, as long as they returned them to the tool box when finished. This was also supported by the study conducted by DBE (2020) and their results are in agreement with the one for this study.

Lack of practical farm equipment for practical lessons

Practically speaking, the lack of a school farm may have a big impact on how Agricultural Sciences is taught and learnt during the teaching and learning process. This can lead to the lack of practical experience for learners. The researcher observed that the learners had no opportunity to attend practical lessons on a farm field. Learners were deprived of a hands-on, practical experience that is essential to comprehending agricultural principles. The learners were only taken to the laboratory where resources were not even enough. The development of practical skills such as planting, irrigation, pest management, and harvesting is vital for vocational subjects such as Agricultural Sciences. However, this cannot be possible without enough resources that can be used during teaching and learning during practical sessions. Failure to conduct a practical lesson will lead the teacher to use theoretical lessons to explain the practical part. Learners were less engaged and interested during teaching and learning. This was due to the fact that they were not provided with useful materials for practical purposes. Learners' participation and interest in the subject matter are frequently raised through practical exercises. The topics introduced during the practical sessions appeared less engaging and abstract in the absence of a farm and its resources. By demonstrating the actual applications of what they are learning, hands-on activities may inspire learners. This study's findings resonate with those of Babu et al., (2015), who found that teachers find it challenging to come up with efficient strategies to teach practical agricultural skills without the use of a farm. Agricultural Sciences teachers were more reliant on lecturing methods and textbooks, where experiential learning and teaching could have been more successful. It was difficult for teachers to evaluate learners' practical competences in Agricultural Sciences without the required resources.

Lack of support from various educational stakeholders

It was noted that during the teaching and learning of theoretical lessons, evaluations simply concentrated on academic knowledge and not practical tests, giving an imprecise image of a learner's aptitudes. Again, due to those challenges, if learners

do not have any real world experience, they can be less ready for jobs in the agricultural industry. Joly et al., (2016) proffer that, since most Agricultural Sciences occupations need real-world experience, it might be difficult for learners to achieve industry requirements without it. This was noted in the data collected using interview questions. Practically speaking, the absence of a school farm may seriously hinder the effective teaching and learning of Agricultural Sciences, as the absence of hands-on learning opportunities decreases learners' involvement, impairs teacher efficacy and overall learners' readiness. The researcher noted that the teaching and learning environment might suffer greatly from the absence of support provided to Agricultural Sciences teachers by the Department of Education, School Management Team (SMT), and the community, among other stakeholders in the teaching and learning fraternity.

The researcher noted during lesson observations that in the absence of assistance, Agricultural Sciences teachers might not have access to continuing professional development and training opportunities to keep current on the newest techniques in the agricultural industry and education sector. The researcher also noted through the interviews that insufficient training chances may impede teachers from improving their abilities and understanding, resulting in antiquated pedagogical approaches. Mbokazi and Lebeloane (2022) concur that it is significant for teachers to have continuous professional development, which will improve their teaching skills and pedagogical content knowledge. It might be challenging for teachers to provide thorough tuition when they lack resources. Digital tools, lab equipment, and textbooks are essential during teaching and learning of both theory and practice.

Academic impact on learners' future caused by the lack of teaching and learning tools

Practical hands-on learning suffers greatly when the materials and instruments needed for practical tasks are not available to be used for the lesson. This was noted through the practical lesson observation where the learners did not have enough equipment. Most teachers highlighted that the DBE's limited funds make it more difficult to manage school farms, buy critical materials, or arrange field excursions and hands-on learning opportunities. During the interviews **Teacher B** indicated that it is necessary for teachers and various stakeholders in the school to purchase supplies

with their own funds and then claim later, as there is a school policy that allows them to do it. Of course, this might cause financial strains and lower work satisfaction. On this note, Boikhutso (2010) says various stakeholders should join hands to try to supply schools with necessary resources to make teaching and learning smooth. Teachers who experience low morale as a result of lack of support may become less motivated and enthusiastic about their work.

It might be difficult for Agricultural Sciences teachers to modify the curriculum to incorporate cutting edge and useful agricultural methods without assistance from relevant educational stakeholders. The researcher noted through interviews that it was possible that teachers would not get the chance to contribute to the creation or revision of the curriculum, which would result in a curriculum that falls short of what learners require (Yildirim, 2003). Insufficient community backing may result in weakened connections between the educational institution and nearby farming stakeholders, thus diminishing the prospects for learners to interact with the agricultural community.

Environment that can enhance teaching and learning of Agricultural Sciences

The DBE's and the community's lack of support for Agricultural Science teachers can have a detrimental effect on professional development, the availability of resources, teacher morale, curriculum implementation, community participation, learner results, innovation, and research possibilities (Modebelu & Nwakpadolu, 2013). At the end, this all-encompassing lack of support lowers the standard of agricultural education and learners' readiness for professions in agriculture. Agricultural Sciences teachers might suffer greatly from unfavourable classroom conditions, which can negatively impact both their effectiveness as teachers and their level of work satisfaction. The following are some significant ways that these settings may impact teachers: For example, inadequate lighting, ventilation, and temperature management in poorly kept or undersized classrooms can make the teaching environment uncomfortable and harmful for the teachers. Long-term exposure to these kinds of circumstances can cause health concerns, such as headaches, exhaustion, and respiratory disorders, which can have an impact on teachers' attendance and performance. Overbearing noise from outside or within the school can interfere with teaching and learning, making it harder for teachers to stay in touch with their learners and hold their attention.

Projectors, laptops, and lab instruments are examples of equipment that might be inadequate or broken, making it more difficult to provide hands-on, interactive teaching for Agricultural Sciences. The researcher noted that learners in overcrowded classrooms may exhibit more disruptive behaviours and find it more challenging to successfully oversee the class (Yildirim, 2003). In settings where proper enforcement of support of discipline is lacking, teachers may find it difficult to uphold order and create a positive learning environment. Physical discomfort, frequent interruptions, and high levels of stress can all make it harder for teachers to engage learners and deliver courses effectively. Agricultural Sciences teachers in unfavourable settings could be less inclined to try out novel teaching strategies or cutting edge techniques as they are preoccupied with handling everyday problems. These findings are not in agreements with the one by the study conducted by Waithira (2013).

Lack of teaching and learning skills to learners with various learning methods

Despite the importance of Agricultural Sciences as a subject in the industry and economy, it is still necessary for teachers to be aware of the protocols that must be followed during hands-on teaching and learning such as the PAT document. The researcher noted that, a majority of Agricultural Sciences teachers did not have the necessary expertise to teach learners on the proper techniques during a practical lesson (Kidane & Worth, 2012). Given that Agricultural Sciences is a vocational subject, teachers must provide learners with both theoretical and practical experience, which forms part of teaching and learning. The researcher noted through the practical lesson observation that the inability to guide learners toward conducting practical might result in inadequate teaching, which can impair their comprehension and proficiency in the topics taught. Once more, the researcher noted that this may result in their competency being weakened by a lack of exposure to appropriate scientific procedures and skills to be used to solve scientific problems (Bonnen, 2019).

The researcher noted through lesson observation that teachers gave an inadequate explanation of how the learners can complete the practical. The researcher also noticed that an ineffective conduct of practical sessions has the potential to demotivate learners, who may grow unfavourable attitudes towards the topic. A teacher must be able to connect the subject's theory with practice and transfer that knowledge to learners during teaching and learning. It is crucial that Agricultural Sciences teachers

to provide learners with real world information and skills, for them to grasp the material completely (Waithera, 2013). The researcher recorded that the employment prospects for learners in the Agricultural Sciences may be restricted by a lack of practical skills during teaching and learning. Agricultural Sciences graduates with gaps in their practical knowledge may find it difficult to succeed in professional or higher education contexts. Given that the teachers showed a lack of understanding of practical tasks, it may also affect the learners' future experiences.

Lack of practical expertise by Agricultural Sciences teachers

Agricultural Sciences teachers who lack sufficient practical experience may spread false information during the teaching and learning of the practical sessions. Due to the lack of teaching and learning resources for practical lessons, it became difficult for the teachers to eliminate misconceptions or to increase learners' understanding from the theory lessons, which were supposed to be done through practical sessions. It will be difficult to correct those mistakes from learners in the long run. Lack of practical expertise on the part of the teachers may result in an inability to evaluate scientific comprehension and practical abilities. This may also result in inadequate feedback systems that are unable to direct pupils' progress (Kidane & Worth, 2012). Reliance on rote learning as opposed to experiential, inquiry-based learning methods might have an impact on learners. It may prevent critical thinking and problem-solving abilities from being inspired. Learners might not be exposed to the most recent advancements in agriculture and their incapacity to use cutting edge scientific methods in practical situations. A lack of practical understanding may result in agricultural practices that are not sustainable. There might also be reduced production due to farming practices' inefficiencies. A bad reputation for a school or institution may hinder subject enrolment.

The learners seemed to be less interested in the subjects during the practical sessions, which was also affirmed by **Teacher A**. It was also observed during the practical session facilitated by **Teacher B** that learners' faith in the educational system's capacity to turn forth qualified graduates was reduced. Agricultural Sciences teachers must invest in state-of-the-art facilities and equipment to enhance their practical procedures. Educational stakeholders must grant access to current instructional tools and materials. Learners did not have necessary resources for the

practical sessions. Agricultural Sciences teachers should collaborate with agricultural research organisations and business leaders. Agricultural Sciences teachers must support group projects and opportunities for hands-on learning (Buruchara et al., 2013).

4.5.2 Teachers' experiences of planning and presenting theoretical and practical lessons in Agricultural Sciences

The researcher noted that Agricultural Sciences teachers face a variety of difficulties and experiences while preparing and delivering theoretical and practical classes. These encounters have a big impact on how well learners learn and how well teachers execute their lessons. Moreover, due to the lack of teaching and learning resources and numerous factors such as minimal time allocation for each period for teaching and learning, a majority of Agricultural Sciences teachers often struggle to strike a balance between theory and practice. Agricultural Sciences teachers must skilfully combine theoretical ideas with real world applications through teaching and learning. Several teachers lacked the skill to link real world application with the lessons taught in the classroom. Careful planning is necessary to make sure that these two elements work well together (Buruchara et al., 2013).

Like the researcher, Bonnen (2019) found that organising supplies and equipment is a common step in lesson planning, but it might take time and depends on the availability of certain teaching and learning resources for subjects such as Agricultural Sciences as a vocational subject to be implemented properly. Through a document analysis of the lesson plans and lesson observation, the researcher noted that budget constraints made it difficult to get the resources teachers needed, which affected the standard and range of practical lessons conducted. To keep the learners interested, teachers frequently include interactive techniques such as debates, role-playing, and practical exercises, but a teacher-centred approach to teaching hinders this. Lack of teaching and learning resources such as textbooks, practical equipment and farms for practical sessions might make it difficult to motivate every learner to participate actively, particularly in big or varied classes. Kabugi (2013) similarly discovered that some teachers had trouble adjusting to learners' differing learning preferences. In this study, almost all the teachers used only the teacher-centred approach during teaching

and learning. To ensure that every learner comprehends the subject matter, teachers must modify their pedagogical approaches to suit a variety of learning preferences.

Monitoring learners' development and making necessary adjustments to teaching and learning approaches depend heavily on ongoing evaluation and feedback. Specific areas are needed for practical learning, such as school farms, gardens, or labs. Inadequate facilities may make it more difficult to carry out these teachings. Weather can cause delays in the planning and performance of outdoor practical activities. It is critical to ensure the safety of learners from various resources to be used for practical sessions. Risks must be anticipated and managed by teachers. To avoid mishaps, equipment must be used and maintained properly. Teachers must engage in ongoing professional development to keep current on the newest techniques in both teaching and agriculture. However, agricultural sciences teachers found it more difficult to use it because of a lack of funding and support from key stakeholders. Attending content workshops and seminars can offer fresh perspectives and efficient teaching and learning methods (Yopp et al., 2016).

Agricultural Sciences teachers may exchange ideas, resources, and best practices for both theoretical and practical classes by working together with other teachers from various schools (Thom, 2020). However, it is difficult for these teachers to get together and debate various concepts that impact the curriculum because of a lack of resources. Seasoned teachers can serve as mentors to less experienced teachers, offering advice and assistance with course design and delivery. **Teacher A** highlighted that one thing that will keep young teachers going and adapting to working with a less resources privilege schools is mentorship by experienced teachers. It is possible to monitor learners' development and gauge their comprehension of theoretical and practical concepts by employing an array of evaluation techniques.

Teachers who regularly get feedback from their learners can improve their methods of teaching and fill up any knowledge gaps. Putting up field excursions and internships can help learners learn more by exposing them to agricultural techniques in the real world. Learners may better apply their knowledge in the real world and comprehend the influence agricultural has on society by getting involved in community initiatives linked to agriculture. For teachers, creating and delivering engaging classes that motivate learners and provide excellent results may be immensely fulfilling and that

will encourage learners to participate in the lesson and attract others to choose the subject in FET phase (DBE, 2020).

If not properly managed, the demands of striking a balance between theoretical and practical learning, as well as logistical and resource issues, can result in stress and burnout. Building trusting connections with learners may improve the classroom atmosphere and increase the effectiveness of instruction. One of the most important elements of a teacher's job is inspiring learners to value and participate in the academic and practical components of Agricultural Sciences. Theoretical and practical lesson planning for and presentation of Agricultural Sciences involves a variety of experiences, including meticulous curriculum planning, captivating lesson delivery, handling logistical and safety issues, continual professional growth, teamwork, keeping an eye on learners' progress, and attending to emotional and psychological issues. When these variables are well managed, teaching and learning may be fruitful and fulfilling, which will enhance learners' learning and enthusiasm in the Agricultural Sciences (Darko et al., 2016).

Teachers' instructions are inefficient

Ineffective teacher guidance can impair classroom management, learners' learning, and engagement during teaching and learning. Poorly written instructions can result in inefficiency and have detrimental impacts on the learning environment in the various ways such as learners could not completely grasp what is required of them if instructions are imprecise or confusing (Akanmu et al., 2016). Learners could become confused, for instance, if a teacher just says, "Complete the Agricultural Sciences assignment," without mentioning which task it is, how much information to include, or when it is due. The researcher noted through lesson observation of **Teacher C** that this wastes important class time by resulting in misconceptions, unfinished work, and the need for frequent explanations in Agricultural Sciences. Additionally, it lowers learners' participation and exacerbates their anger toward the subject. Learners may find it difficult to follow instructions if they are not broken down into small, sequential parts. Saying something like, "Research the topic and write a report," might not be sufficient to explain where to begin or what the essential stages are. Learners could become stuck at the start or omit important stages, which could result in work that is either badly done or unfinished. As a consequence, a teacher has to step in frequently,

which throws off the lesson's flow and takes longer than required. Instructions that are too complicated or comprehensive may be difficult for learners to follow during the teaching and learning. When the teacher gives lengthy, multi-step directions all at once, learners may feel overwhelmed or overlook crucial information, which may lead to academic poor performance in the subject.

Learners' activities do not contribute effectively to lesson objectives

The educational process can be compromised when learners' activities fail to adequately support classroom goals. This can lead to distracted learners, time wastage, and missed learning opportunities for both theoretical and practical lessons in Agricultural Sciences. There are a number of reasons why actions and lesson objectives cannot align. During document analysis, it was discovered that **Teacher B** faced difficulties in designing relevant learning activities. Swan and Burkhardt (2014) indicate that this practice is mostly prevalent among novice teachers. A teacher's intended knowledge or skills are not developed through activities that are not in line with the lesson's learning objectives. For instance, learners are not engaging in critical analysis if the task just requires them to memorise dates and information, even if the goal is to enhance critical thinking in interpreting historical events. Learners may effectively finish the task without developing the necessary skills, which would result in a cursory comprehension of the material. A lesson's key objectives are not addressed. Learners may see an exercise as busywork if they do not grasp its purpose or how it relates to the lesson's objectives. For example, if learners are unaware of how a group discussion relates to a lesson's goal of enhancing communication or teamwork, it may feel unstructured. Learners may lose interest and get unmotivated if they do not have a strong sense of purpose of the teaching and learning process. Time is wasted and the intended results are not reinforced by activities that are viewed as unrelated or unrelated to the goals.

A lesson plan might have been developed without considering a direct connection between the materials provided (e.g., textbooks, articles, videos) and the activities learners are asked to engage in. This could happen if lesson objectives, materials, and activities are planned in isolation rather than as an integrated unit. This was observable from **Teacher C**'s lesson plan, which wanted more resources to be used than the ones were available in the classroom. The materials fail to support the

activities or the learning goals because they do not provide relevant information or examples for learners to apply during activities. The listed resources could be out-of-date, badly selected, or unrelated to the requirements of the learners or the present curriculum. For example, a lesson plan might not be in line with current practices in the learning activity to use an old study piece for Agricultural Sciences lesson. **Teacher A** said that it can be challenging for learners to interact with resources that no longer accurately represent the subject matter, which makes it harder for them to relate the materials to the assignment. In accord with Buruchara et al., (2013), the researcher noted that most teachers struggle with construction of learning activities.

The materials might not be appropriate for the activity. For instance, the learners will not have the tools to hone their critical thinking abilities if an assignment calls for critical analysis or problem-solving but the materials simply offer factual information. Learners' work will lack depth and seem distanced from the materials as a result of the exercise. It is essential that the resources offered be closely related to the goals and the nature of the tasks for learning activities to successfully support lesson objectives. Teachers may create a more effective and cohesive learning experience by carefully choosing, evaluating, and aligning materials to make sure learners have what they need to participate in and finish the learning activities.

Poorly written objectives leading to faulty inferences

The construction of lesson objectives remains one key component as it influences the level of classroom engagement and the type of skill of learners gain at end of the lesson. Inaccurate lesson guidance about what learners should learn or how their learning will be evaluated might result from poorly defined objectives. Waithera (2013) indicates that most teachers face difficulties in constructing lesson objectives and teachers may become confused as a result of this misunderstanding, and tests may not evaluate the desired abilities or information. When goals are overly generic or broad, they fail to give teachers and learners clear guidance on the information and abilities that need to be acquired. Without a defined emphasis, broad objectives give the impression that a wide variety of learning is expected. **Teacher B**'s lesson plan had lesson objectives which did not have action verbs but only theory without the actions, which will require some movements in the lesson to keep the lesson vibrant.

Lesson assessment is not connected with the behaviour indicated in the objectives

The learning process may be hampered if the lesson evaluation is unrelated to the conduct or activities specified in the objectives. Learners may get confused as a result of this mismatch, not understanding what is expected of them, and the teacher's ability to effectively assess learners' learning may also be impacted. The researcher observed that **Teacher D** had learners' assessment that was not in line with what the lesson wanted to achieve. The assessment wanted learners to work in groups while the lesson objective was to allow all learners to contribute to constructed knowledge. When evaluating critical thinking or problem-solving abilities, the test may concentrate on fact recall. A teacher must make sure that the evaluation techniques closely correspond to the kind of learning that the objectives call for. If the goal is to analyse, for instance, pictures or case studies in Agricultural Sciences could be more helpful than multiple-choice questions. Bonnen (2019) indicates that learners may become confused about what they are expected to do if the lesson objectives are unclear or overly general, and the evaluation may encompass unexpected topics of the subject. This includes making sure the learning goals are time-bound, relevant, measurable, achievable, and specific SMART (Specific, Measurable, Achievable, Relevant, Time-bound). Having well-defined goals aids in creating a focused evaluation in a lesson. It may be difficult to determine if learners have satisfied all of the different kinds of learning objectives (such as cognitive, emotional, and psychomotor), if all of the evaluations are of the same kind (tests, assignments). To cover every facet of the goals, a teacher must use a range of evaluation instruments, such as projects, talks, presentations, or hands-on activities. Summative evaluations, such as end-of-unit examinations, may not give enough information about whether learners are fulfilling learning objectives during the teaching and learning process.

4.5.3 Teachers' views on the challenges faced when planning and presenting Agricultural Sciences lessons

Most Agricultural Sciences teachers felt that insufficient materials and equipment for teaching and learning had an impact on how lessons could be understood by learners and delivered by teachers (Wang & Knobloch, 2018). The delivery of theoretical and practical teachings has been hampered by a lack of contemporary teaching tools and supplies. According to some of teachers, inadequate resources, such as tools, seeds,

and fertilizer, restricted the hands-on teaching and learning of Agricultural Sciences. All the teachers indicated that budget constraints in schools also made it more difficult for them to maintain facilities such as school farms or labs and buy supplies that are required. Most teachers stated that reliance on outside financing sources, such as grants or contributions, may not always be continuous or dependable. **Teachers A, B** and **C** indicated that it may be challenging to carry out practical exercises in a classroom with inadequate space and amenities. A school farm or garden is necessary for hands-on Agricultural Sciences teaching and learning, but not all schools have access to one. A lack of teaching and learning resources or experience frequently results in the neglect of routine maintenance for Agricultural Sciences infrastructure and equipment. Yopp et al., (2016) opine that the lack of teaching and learning resources hampers learners' academic performance.

Inadequate lighting, ventilation, and temperature regulation are examples of poor environmental factors that can affect the learning environment of Agricultural Sciences. Akanmu et al., (2016) also shared similar sentiments. The teachers stated that there was insufficient time allocated for practical tasks in the curriculum due to its strong theoretical emphasis. It might be difficult to adequately address theoretical principles and practical applications within the time given for teaching and learning. A concentration on theoretical knowledge at the expense of practical abilities may result from an emphasis on standardised testing. Inadequate techniques for evaluating practical abilities can diminish the significance of experiential learning. It is possible that Agricultural Sciences teachers lacked access to ongoing training opportunities to keep up with the latest developments in Agricultural Sciences. Teachers may find it more difficult to implement new teaching strategies and practices if they have limited chances for professional development that can help them to improve in teaching and learning (Zhang, 2008).

Most Agricultural Sciences teachers indicated that insufficient chances for collaborating with colleagues may result in seclusion and restricted exchange of optimal methodologies. It may be challenging for novice Agricultural Sciences teachers to organise and deliver classes effectively if they receive insufficient mentoring and assistance through ongoing content workshops. It might be difficult to motivate and attract learners in Agricultural Sciences who have different levels of

enthusiasm. Agricultural Sciences teachers must put in more work and be more creative to accommodate different learning styles and demands for all learners. It might be especially difficult to control behaviour problems and keep discipline during practical exercises for Agricultural Sciences. It may be challenging to give each learners individualised attention and assistance during both theoretical and practical sessions in large class sizes. Williams and Dollisso (2018) reported the same findings. It is very important to make sure that practical activities are safe, especially when they include tools and machinery.

Inadequate safety procedures and insufficient readiness for emergencies may heighten the likelihood of mishaps during hands-on training. To this end, **Teacher D** had this to say: "*In this situation you have no resources to teach learners the practical part. This can lead to lack of motivation to do the practical session because things are not in order*". It might be difficult to provide enough supervision of practical tasks, particularly in situations when there are many learners in one classroom, as observed in **Teacher C**'s class (Swan & Burkhardt, 2014). Furthermore, curriculum guidelines restricted the teachers' ability to innovate and modify classes to suit the requirements of their learners during teaching and learning. Programmes for Agricultural Sciences education might be difficult to execute if the school management does not support them. **Teacher E** proffered that protracted permission procedures for new projects, outings, or supply purchases cause delays or disturbances to the curriculum. "*Keeping up with numerous rules and requirements can make teaching more stressful and time-consuming*'' (**Teacher A**). The integration of contemporary teaching techniques and methods have been impeded by restricted access to digital materials and technology. For the purpose of teaching Agricultural Sciences using technology, teachers might need more training. Kidane and Worth (2012) say that teachers need special training on the use of technological materials.

The difficulties that Agricultural Sciences teachers encounter when organising and delivering lessons are numerous and include a lack of resources, poor infrastructure, problems with the curriculum and time management, the need for professional development, difficulties with learners' engagement, safety concerns, administrative and policy restrictions, and technological difficulties. To guarantee that teachers have the tools, training, and support, they must provide effective and interesting agricultural education. Addressing these issues calls for a comprehensive strategy that includes

assistance from the community, the Department of Education, and school administration (Msigala, 2010).

4.5.4 Lesson planning and presentation from the perspective of the theoretical framework

The findings of the study are not in line with the two theories by Mitzel (1969) and the one by Clark and Peterson (1986). The researcher discovered that Agricultural Sciences teachers acknowledge that the use of lesson planning during teaching and learning process is important, as it guides the process teaching and learning for both learners and teachers, as stated by Clark and Peterson (1986). However most of the findings in the study did not correspond with what the theory says it must be done. For example, Clark and Peterson (1986) say that all teachers must use a lesson plan to guide and control the lesson, but some teachers indicated that they did not use lesson planning when teaching. Some of the reasons given by teachers on why they did not use lesson plans were that it is time-consuming, some said they were too experienced for the subjects to a point they felt no need for lesson planning. The researcher also discovered that during teaching and learning, teachers used teaching strategies which are not supported by Miztel's (1969) theory, which says that learners must be kept active in the teaching and learning process. Most teachers used the teacher-centred approach. The study was guided by two theories, one developed by Mitzel (1969) and the other by Clark and Peterson (1986). Mitzel (1969) sheds light on the teaching strategies used in the teaching and learning of vocational Agricultural Sciences in the FET phase.

Mitzel theory (1969) give prospects from the four variables

The presage (teacher)

The researcher noted that teachers' experiences tend to affect classroom teaching and the learning environment. Teachers who are experienced have a way out to adjust in working with learners during teaching and learning. They also have a way of using different ways to conduct practical sessions even when resources are not enough. The researcher also discovered that teachers' characteristics included formal experiences in the subject and readiness to teach in a classroom. Some teachers indicated that due to many years in teaching the subject, they had an added advantage in the

teaching and learning process. Again, all Agricultural Sciences teachers highlighted that lesson plans assisted them to have fruitful and good lessons, but also acknowledged that they consume their time and that they were preparing lesson plans for the sake of formality (Smith et al., 2004). Readiness plays a huge role during the teaching and learning process. Lessons become more relevant during teaching and learning when a teacher prepares for the lesson before going to class. Prepared teachers use lesson plans during the teaching and learning process. The findings of the study concur with Mitzel's (1969) theory, where it says teaching and learning is influenced by and revolves around the context (learner), prestige (teacher) and learning variables, which talks about the teaching and learning taking place in the classroom. During the teaching and learning of theory and practice of Agricultural Sciences, the teacher, the learners and the process play a huge role in the success of a lesson.

The context (learner)

The researcher noted that learners' attitude in the classroom has an impact on their teaching and learning. Similarly, Dyer and Osborne (2012) state that if a learner is filled with positive inputs, such a learner will have a smooth and good learning in the classroom. In contrast, a negative attitude from a teacher during teaching and learning affects how learners receive a lesson. The findings of the study agree Mitzel's (1969) theory when it says that learners' teaching and learning depends on the environment of the classroom. Some teachers never created a conducive environment for learners who were not cooperating, but some created a good teaching and learning environment where learners listened to the teacher and the process went smooth. A shortage of teaching and learning resources has an impact on the teaching and learning process. Some lesson objectives could not be attained due to the lack of teaching and learning resources. Therefore, these has affected learners' academic performance because some of the lessons were explained but no hands-on was provided due to the shortage of resources. Similarly, Knobloch (2018) discovered that due to shortage of teaching and learning resources, a gap was observed in connecting theory with practice as some practical lessons were not conducted.

Process variables (learning in the classroom)

A majority of Agricultural Sciences teachers did not teach the theory properly because they employed the teacher-centred approach, thus restricting the learners from actively participating in the teaching and learning process. Similarly, Boikhutso (2010) noted that poor teaching of theory hinders learners from developing critical thinking skills. The teaching and learning methods used were not in line with how the subject must be taught, as Agricultural Sciences is a vocational subject that requires that learners to actively contribute to teaching and learning and practical work. The findings of the study are in line with the theory by Mitzel (1969) on teaching and learning resources. Therefore, the results of the study reveal different factors which affect the teaching and learning in the classroom, as proffered by Mitzel's theory. The lack of teaching and learning resources affects learners' academic performances and the process of teaching and learning is compromised due to the shortage of these resources. Moreover, an inappropriate teaching and learning method affected the effectiveness of the teaching and learning processes. The teacher-centred approach negatively impacted the teaching and learning process. Learners must be kept active through participation during teaching and learning. The interaction between teacher and learners during the teaching and learning process has an impact on the process (Msigala, 2010). In this regard, the study agrees with the theory by affirming that learners must remain active throughout the lesson.

Clark and Peterson's (1986) prospects

The findings of this study are in line with the theory by Clacks and Peterson (1986), which says that lesson planning is key to the teaching and learning process because it allows a teacher to contextualise the lesson before the time to teach comes. Almost all participant Agricultural Sciences teachers agreed that lesson planning allows them to have a great structure of the lesson before the actual teaching takes place. Even though all participant teachers participated agreed that lesson play is a basic psychological process that offered them an opportunity to organise their lesson, they indicated that it created more work for them and consumed their time to do daily activities. Similarly, Yildirim (2003) stipulated the usefulness of a lesson plan as a guide during the teaching and learning of Agricultural Sciences. Some teachers' lesson plans were not in line with what the theory stipulates on lesson planning. Some

lesson plans did not have clear lesson objectives and their structure was not similar and standardised.

The findings also affirmed the theory of Clack and Peterson (1986) that lesson planning assists a teacher to clearly state the lesson objectives and goals that can be attained at the end of the lesson. The teachers prepared assessments that misaligned with the time allocated during teaching and learning. Hence, a majority of teachers had a challenge when it comes to time allocated for teaching and learning. In accord, Clark and Dunn (1991) emphasised the importance of drafting lesson plans pre-teaching.

The framework created by Clark and Peterson (1986) describes planning as a fundamental psychological activity that enables a teacher to see the future and create a framework to direct it. Hence, the framework served as an inspiration to the researcher for this study. Abdulhamid (2015) supports the use of Clark and Peterson's (1986) framework in planning for lessons. The researcher had observed that teachers only use the lesson plan for formality and therefore misalign with the purpose of a lesson plan. Some Agricultural Sciences teachers could not follow the logic of a lesson plan during teaching and learning and some of the components of the lesson plan were not well explained.

The researcher also noted that not all of the content of the subject meant to be delivered was delivered during the teaching and learning of theory and practice. Darko et al., (2016) similarly reported the same result. Thus, the participant teachers did not effectively apply Clark and Peterson's (1986) theory. Some of the lesson objectives were unattainable and misaligned with the curriculum policy. Overall, the teachers did not fully implement Clark and Peterson's (1986) thoughts on lesson planning before going to teach the learners in the classroom.

Mitzel's (1969) theory emphasises that Agricultural Sciences teachers should use different teaching and learning approaches and must be guided by the theory in executing the teaching and learning process. The researcher noted that not all that is prescribed by Mitzel's (1969) theory is implemented during teaching and learning. Moreover, not all the teachers used various teaching and learning methods. Some used the teacher-centred approach, which never gave learners an opportunity to fully

participate in the lessons. Similarly, Thom (2020) observed that teachers used the teacher-centred approach and did not offer the learners an opportunity to participate and contribute to the teaching and learning process. The researcher also noted that lessons were teacher-based. For instance, during practical lessons, **Teachers B** and **D** did not give the learners instructions on how the practical lesson had to be conducted. Learners were always left behind during the theoretical lesson, as they were not contributing to the lesson through their participation. The learners could not acquire skills and knowledge during teaching and learning as they were passive in the lesson.

4.5.5 Teaching and learning approaches

As mandated by the National Curriculum Statement (RNCS, 2002), which outlines the curriculum's ideals and places a strong emphasis on learner-centredness and the achievement of learning outcomes, it became clear from the observations made in the classroom that the teaching and learning approaches did involve a certain level of learner engagement. In the lessons observed, no teacher used the approach that involved learners to contribute their ideas or opinions. During the theoretical lesson observed in grade 12, it became evident that learners were just passive and given the topic and the teacher was leading in the teaching process. The researcher observed **Teacher A**'s lesson, and only a few learners were actively participating through asking questions. Young and Edwards (2011) also discovered that the teacher-centred approach hindered the learners from participating in the teaching and learning process. Elsewhere in the lessons observed by the researcher, no learners showed participation due to the teacher-centred approach employed during the lesson.

4.6 Chapter summary

The goal of this research project was to explore the experiences and difficulties encountered by Agricultural Sciences teachers while organising and teaching theory and practice. Both novice and experienced teachers viewed lesson preparation as a blueprint or guide that outlined a teacher's activities in the classroom over a certain period of time. Classroom preparation, according to both types of Agricultural Sciences teachers, keeps teachers focused on different topics of the subject, which aids in the achievement of class teaching and learning objectives. Lesson planning was said to provide teachers with the confidence they needed to present their material in an

Agricultural Sciences classroom. Additionally, a lesson plan provides Agricultural Sciences teachers with an opportunity to consider a range of strategies for engaging learners in various activities such as theory and practice, which aids in the creation of a learning environment in the classroom. It is clear from this study that creating lesson plans and teaching Agricultural Sciences classes present a number of difficulties for teachers.

Five Agricultural Sciences teachers were interviewed, observed in the classroom, had their lesson plans examined, and field notes were gathered to obtain insights on their experiences and difficulties in Agricultural Sciences. The various needs and talents that learners have and time restraints, poor training, and budget limitations were noted during data collection. In Agricultural Sciences, teachers often struggle to strike an ideal balance between theoretical ideas and real world applications. It might be difficult to find suitable hands-on activities and to incorporate real-world examples, but both are necessary for teaching and learning to be effective. Lack of access to pertinent materials, teaching and learning tools, and laboratory equipment was a problem for many Agricultural Sciences teachers. This made it more difficult for them to teach the theoretical and practical aspects of Agricultural Sciences in a thorough and interesting way. Their efficiency in lesson preparation and delivery may be hampered by a lack of sufficient training opportunities and assistance in the Agricultural Sciences in various schools.

CHAPTER FIVE

SUMMARY, CONCLUSION, IMPLICATION OF THE FINDINGS AND RECOMMENDATION

5.1 Introduction of the chapter

The previous chapter presented the findings of the researcher from an exploration of the experiences and challenges faced by Agricultural Sciences teachers during lesson planning and presentation of theoretical and practical lessons. This chapter presents the summary, conclusion, implication of the findings and recommendation of the study. This is the last chapter of the study.

5.2 SUMMARY OF THE FINDINGS

The aim of the study was to explore the challenges and experiences faced by Agricultural Sciences teachers when planning and teaching theoretical and practical lessons in the Capricorn South District, South Africa. The following are subsections that are used to summarise the study:

Agricultural Sciences considered the most important subject which contribute a lot in boosting the south African economy. It is very much important to solve all challenges which face agricultural industry in order to keep the industry running smooth.

Many literatures indicate that Agricultural Sciences teachers faced lots of challenges on a daily basis when teaching the subject. Some of the problems faced by Agricultural Sciences teachers includes lack of teaching and learning resources, lack of funds for practical part and poor learners choosing the subject as well as shortage of qualified teacher.

The researcher opted for qualitative research approach underpinned by interpretivism paradigm. The study used hermeneutic phenomenological research design. Purposive sampling was used for the study. The researcher employed field notes, non-participant observation tools, semi-structured interviews, document analysis of teachers' lesson plans, and non-participant observation methods. Collected data were analysed through the use of emergent themes, documented lesson plans, grouping written notes and listening to audio-taped interviews

The findings of the study indicate that majority of Agricultural Sciences does not do lesson plan, lack resources for teaching and learning, learners do not do the practical lesson due to many factors. It has been noted by the study that learners lose interest in the subject due to poor practical part and huge failure of leaners.

5.2.1 Subject Content Knowledge

The finding indicated that Agricultural Sciences teachers are well equipped with subject knowledge. However, the delivery of the knowledge to the learners through the teaching and learning of the theory and practice was wanting. During the teaching and learning of theory, almost all Agricultural Sciences teachers were using textbooks to summarise the content for learners. When giving examples, no emphasis was made for learners. On the use of the practical manual, almost all teachers instructed the learners to open manual and refer to it during the practical sessions. Learners were not guided or taken through the CAPS practical manual. Some Agricultural Sciences teachers gave the learners practicums that were not related to the topic connected to the theory. In fact, **Teacher A** stated that, *"I only give them this practical for the sake of doing practical, because they practical we should be doing now we don't have materials for it''*. This indicated that the learners were not fully exposed to the manual for practical lessons. Learners were not fully equipped with the skills and knowledge for the practical lessons, as there was no explanation from the teachers. Most Agricultural Sciences teachers struggled to link the theoretical to the practical content. On this aspect, **Teacher E** said, *"Sometimes we just do the practical for the sake of doing it, but we don't have tools do support what we are teaching in classrooms, this is not helpful because practical must emphasize what I said in the classroom during theory teaching"*. All Agricultural Sciences teachers managed to design lessons plans, but the plans were not used during the teaching of both theory and practice. Some teachers did not even bother to bring the lesson plan to the classroom.

5.2.2 The use of teaching and learning methods

The finding of this study showed that most teachers who participated in the study had a challenge with the use of different teaching and learning methods. Most teachers were using the teacher-centered approach to teach. Some learners seemed confused during the teaching and learning process. The teacher could explain from the textbook and try to describe a certain tool that could be used in the agricultural industry, but the

learners could not see the tool. This was due to the shortage of teaching and learning material, which hindered the teachers from providing effective teaching and learning. Since learners depicted different learning methods, but the teachers strictly used only one method of teaching, where learners were not given an opportunity to participate in the lesson. **Teacher D** confirmed that, "*I don't have any option, I teach and try to explain to learners even though they have to look on what we are talking about, that cannot be easy because we don't have enough textbook and practical manual*". Therefore, it can be said that the teachers struggled to use different teaching methods to cater for various learners who preferred different teaching and learning methods. Moreover, not all teachers could stick to the medium language of instruction, which is English. This was seen when all teachers were switching from English to Sepedi. In fact, some teachers could not adequately interpret and explain the results obtained during the practical sessions.

5.2.3 Assessment knowledge and application

The researcher also focused on the quality, type and structure of assessments given to the learners by the teachers. All Agricultural Sciences teachers who participated in the study managed to execute a well-structured, good quality and CAPS compliant assessment to the learners. During the document analysis of the lessons plan, it was seen that teachers gave both theory-based and practical-based assessments, which strengthened the learners' knowledge in both aspects. Each and every assessment activity had a marking tool such as marking guideline and rubric. Different assessments had good total marks, where each and every assessment had no less than 20 marks. Lesson objectives were in line with the assessments given to the learners. Some lesson objectives were attainable through the completion of the assessments given to the learners.

5.2.4 Environment for teaching and learning of the theory and the practice

During the teaching and learning of theoretical and practical lessons of Agricultural Sciences, there was a setup of chairs and workstations to encourage conversation among teachers and learners. There was, therefore, a need to think about adaptable seating configurations that are simple to reorganise for various occasions. The venues used for teaching and learning both theory and practice was conducive, with air ventilation and appropriate seating arrangements for the learners. Agricultural

Sciences teachers ensured that learners had access to some of the tools available and needed, including reference materials, digital devices, lab equipment, and textbooks. Some Agricultural Sciences teachers created an environment that was stimulating and motivating to the learners by incorporating instructional posters, learners' projects, and pertinent displays. Most Agricultural Sciences teachers established and conveyed explicit guidelines and standards for conduct and scholastic achievement. To inspire learners, teachers must reward and acknowledge good conduct. Furthermore, learners' academic accomplishments must be acknowledged by teachers through an applause for and appreciation of learners in class. **Teacher B** indicated that a conducive environment is good for teaching and learning, and that this includes by creating plans for settling disputes and addressing disturbances in a reasonable and peaceful manner during the teaching and learning process. The classrooms were orderly and had a good channel of communicating through raising a hand and being recognised by the teacher.

5.3 Implication of the findings

An educational curriculum that is out-of-date or inadequate due to a lack of resources may not include the most recent innovations in the agricultural industry. Lack of access to teaching and learning resources or real-life Agricultural Sciences experiences might lead to an excessively theoretical curriculum that is less applicable to agriculture in the real world. Lack of teaching and learning resources might affect learners' academic performance and can lead to low learners 'enrolment in Agricultural Sciences. To keep abreast with the most recent developments in Agricultural Sciences, teachers must continue doing developmental course in education to improve their content and pedagogy. Their ability to deliver high-quality teaching and learning is impacted if this is inadequate. Without the right guidance and assistance, Agricultural Sciences teachers, precisely novice teachers, may find it difficult to provide quality teaching and learning of the subject. Teachers will be unable to offer Agricultural Sciences learners hands-on learning experiences that are essential to comprehending Agricultural Sciences methods if they lack adequate labs and field equipment.

Agricultural Sciences learners may not be taught new farming techniques if they do not have access to modern technologies, which might hinder their readiness for the needs of the workforce today. Teachers who experience ongoing difficulties without

receiving sufficient support may get burnt out and lose their enthusiasm and efficacy as subject teachers. If Agricultural Sciences teachers cannot get beyond these obstacles, it might impair their dedication and sense of self as professionals, making them feel unappreciated or incompetent. Lack of resources, support, or training may make it difficult for teachers to put new teaching ideas into practice for both theory and practical sessions. It might be difficult to evaluate learners' practical skills without the right resources and settings, which makes theoretical knowledge the main focus. Without the requisite practical skills, graduates may find it more difficult to get employment in the agricultural industry. Studying Agricultural Sciences may become less interesting and demotivating if there are no stimulating and practical learning opportunities.

Learners' employability and career prospects may be negatively impacted if they are ill-prepared for the needs of the agriculture economy today. Learners' capacity to innovate and find solutions to actual Agricultural Sciences problems may be hampered by a lack of exposure to contemporary technology and practical difficulties. The community's ability to absorb contemporary agricultural information and practices will be hampered by underprepared learners, which has an impact on the growth of local agricultural industry. The adoption of sustainable farming techniques can be impacted by inadequate agricultural education, which can have an influence on the region's environmental and economic sustainability. The level of education received by Agricultural Sciences learners directly affects their quality of skills and education. Lack of proper Agricultural Sciences education can result in a workforce with lower skill levels, which can affect the agriculture industry's profitability and production.

5.4 RECOMMENDATIONS

The previous chapter focused largely on the results and their discussions by the researcher. The discussion focused on the different themes derived from the responses by Agricultural Sciences teachers. This themes were formed as the teachers answered the research questions. Some of the themes discussed included: Agricultural Sciences teachers' perceptions of lesson planning on pre-teaching theory and practice, teaching and learning approaches used by Agricultural Sciences teachers, and the extent to which Agricultural Sciences teachers enacted the lesson plans in the classroom; the planning of lessons by Agricultural Sciences teachers for

both theoretical and practical components, difficulties Agricultural Sciences teachers faced when designing lesson plans, the challenges facing Agricultural Sciences teachers during teaching and learning, the failure to meet curriculum objectives due to limited teaching and learning resources for both theory and practice; a comparison of novice teachers' and experienced teachers' approach to the teaching and learning of Agricultural Sciences; the teaching methods used by the participant teachers and their implications on the learners' understanding of the basics of Agricultural Sciences.

According to the findings, participant Agricultural Sciences teachers had different experiences and faced numerous challenges when planning lessons and actually teaching both the theory and practice of the subject. Additionally, they viewed lesson planning as being an organised method for teaching and studying Agricultural Sciences, guaranteeing that all relevant topics and ideas are covered in a certain amount of time. This framework facilitated learners' understanding of the course's evolution and helped them grasp difficult concepts in Agricultural Sciences. The findings led to the conclusion that lesson preparation enables teachers to clearly identify the learning objectives for each class. These goals direct the attention and efforts of both teachers and learners by outlining what they should know or be able to perform at the conclusion of the class. Consequently, the researcher recommends the following:

1. By making sure there are enough classrooms, resources (tools) and spaces for Agricultural Sciences practical's, schools may create an environment that is conducive to a researcher of agriculture. Learners will be encouraged to pursue agriculture as a result of this investment post matric.
2. The responsibilities assigned to teachers as curriculum translators and implementers include lesson planning. It is mandated by the curriculum policy, and the training teachers received on the National Curriculum Statement that lesson plans must be created in harmony with work schedules and learning programmes. Teachers are therefore required to organise their lesson planning using these formats. This study recommends that teachers must participate in such workshops.
3. Agricultural Sciences teachers should get in-service training at former Agricultural Sciences colleges such as Tompi Seleka and many more, which will equip them

with agricultural information. Learners must attend practicums and exhibitions in different agricultural industry to observe how things are done.

4. To improve learners' abilities and knowledge, all parties involved in the nation's growth should donate teaching and learning materials to schools. This is mostly due to the fact that Agricultural Sciences, when taught well in both the theoretical and practical work, learners will develop their potential to enhance people's lives in different levels of the economy.
5. The government must hire additional Agricultural Sciences teachers and supply educational materials, such as land, labs, and equipment, to support the teaching and learning of Agricultural Sciences in schools.
6. Designing and teaching are two of a teacher's main responsibilities. Every level of teaching must include a plan to help teachers organise and conduct their daily classes. The style and level of precision of these plans vary greatly. Some teachers prefer to create complex, thorough outlines, while others rely on the most succinct of notes. No matter the format, teachers must choose carefully the methods and tactics they will use to guide learners toward their learning objectives. This study recommends that teachers must be exposed to different teaching methods which will cater different learners in the classroom with different learning styles.
7. Effective teaching requires an excellent time management of the course. This entails having control over how time is spent. Planning for the efficient use of class time is a hallmark of effective teachers. This study recommends that teachers be given a special workshop which strictly stresses useful ways of time during teaching and learning.
8. Teachers must make sure that they approach the Agricultural Sciences topics in a way that would entice learners to enroll in it. This may be accomplished by making sure that the school farms and laboratories are used to impart useful knowledge to learners during teaching and learning, mostly for the practical sessions.
9. To promote the teaching and learning of the Agricultural Sciences, teachers must inform learners about the jobs in the agricultural industry that are open to them and how Agricultural Sciences will make them to contribute to the economy.
10. For the school administration to understand the necessity of allocating land for agricultural practical or school farming, it is important to establish strong relationships with the local authorities.

11. Materials for the successful teaching and learning of practical Agricultural Sciences should be made available by the school administration together with the Department of Education.
12. School administrators should set aside a specific percentage of available funding for the teaching and learning of Agricultural Sciences in their institutions, which will boost the availability of teaching and learning resources.
13. The researcher observed that having different and an overload of work hindered both novice and experienced Agricultural Sciences teachers from creating lesson plans for the successful teaching and learning of theory and practice. Therefore, it is advised that the school administration in question reduce the workload of its teachers, mostly the administration work.
14. Additionally, it is advised that school administrators offer mentorship programmes led by experienced teachers. This way, mentors can assist new teachers with creating smart objectives, coordinating learning activities with objectives, preparing engaging lesson plans, and creating valuable teaching aids for each lesson.
15. At the school level, it is critical to verify the time allotted each week for science-specific practical work, along with monitoring to ensure that these slots are used as scheduled for scientific experiments or investigations. One cannot overstate how useful science is in everyday life. Teachers and learners alike can make use of the resources at their disposal, and arrangements can be made to use funds allotted by the school to buy chemicals and lab equipment.
16. Because Agricultural Sciences are scientific subjects, teaching them requires that learners participate in practical activities such as experiments or investigations so they may observe, evaluate, analyse, and apply scientific knowledge and abilities. It is essential that the lessons be prepared and implemented in the classroom exactly as intended.
17. To assist teachers adapt to the challenges faced in lesson planning and teaching within an outcomes-based framework and improve their experiences, knowledge and skills toward a relevant understanding and interpretation of the curriculum, curriculum support and teacher development should be focused on this goal.
18. Worksheets on particular experiments that the teacher will do with learners in each of the knowledge domains might be set up so that, as part of the annual plan, the teacher is already aware of the experiments that will be conducted and the

equipment and chemicals required. Additionally, it can be guaranteed that these crucial resources are made accessible ahead of time.

19. After being created and filed, lesson plans and activities for learners may be reviewed and adjusted for use in the future. This implies that choosing learning activities for learners that will address the learning goals will not be a waste of time and effort, if careful reference is made to the numerous sources and the required fundamental knowledge and ideas. The following year's refinement and fine tuning will not take a lot of time. More time might be spent on introducing new ideas and creating fresh assessment assignments, classwork, homework, projects, and examinations.
20. Learners must be encouraged to consider Agricultural Sciences as a subject, despite the fact that the terrain around them is thought to be dry or semi-arid. This is because some Agricultural Sciences approaches are appropriate for these kinds of environments, and technology may facilitate the meaningful application of Agricultural Sciences practices in these kinds of environments. To enhance and transform the state of Agricultural Science education, a significant amount of time and energy must be devoted to encouraging the comprehensive creation of well-organised, meticulously detailed lesson plans. To build a country that preserves its values, recognises science as a phenomenon, and lives sustainably, it is the duty of teachers teaching Agricultural Sciences to ensure that the potential of their learners is maximised. Every learner in the FET band, from grades 10 to 12, has the chance and capacity to understand scientific concepts and abilities through the research in Agricultural Sciences.
21. Further studies can be conducted in line with the tittle looking on the challenges faced by agricultural sciences teachers when planning and presenting theory and practical due to shortage of funds, the study was limited in terms of exploring more about the study.

5.5 Conclusion of the entire study

It can be concluded from this study that teachers must comprehend the need to prepare lessons and create learning programme in an outcomes-based curriculum. This will help in ensuring that their choices are organised and structured for classroom teaching and learning, especially in Agricultural Sciences. It was also revealed that a majority of Agricultural Sciences teachers lacked the skills and knowledge to enact a

good lesson plan that could be used during teaching and learning. Again, what can be inferred from this study is that while teachers developed plan lessons and tried to implement them in the classroom, there were several obstacles to their preparations for and delivery of lesson plans in Agricultural Sciences. It can be concluded that most teachers saw lesson planning as a time-consuming activity; they merely did it because of the Department of Education's policy. This means that there is a need for Agricultural Sciences teachers to attend workshops on planning processes and their importance for better planning practices and execution of Agricultural Sciences lessons. The sampled teachers were just developing lesson plans for formality's sake. On the question of shortage of teaching and learning resources, this study noted that at some point, both the teachers and learners failed to attain the teaching and learning lesson objectives due to limited resources.

A vital component of teaching and learning is the application of the lesson plans of Agricultural Sciences in the classroom. This may be done by following a structured curriculum and receiving specific inset training in lesson planning and implementation in the classroom. Collaboration among Agricultural Sciences teachers at the school and cluster levels, through workshops geared toward teacher development, would foster a culture of planning as a way to give Agricultural Sciences teachers the practical and pedagogical knowledge they need to help learners reach their full potential. A project organised by the teachers themselves, working with various internal and external support systems for education and its requirement is necessary for Agricultural Sciences, since the area is a vocational subject. Teachers can exchange ideas on the best ways to handle difficulties and experiences that arise during teaching and learning of Agricultural Sciences.

It will be difficult to satisfy the planning and instruction demands of Agricultural Sciences; thus, teachers must take the effort to acquire new material and develop their skills on their own initiative. Even when there has not been enough departmental training, better classroom practices will result from appreciating and comprehending the importance of planning lessons and making an effort to implement them in a systematic way. The shortage of teaching and learning resources can lead to poor academic performance among learners doing Agricultural Sciences. Therefore, enough time is required mostly for the practical session where teachers need to demonstrate the process and allow learners to perform it.

Last but not least contact time may also be used efficiently, as preparation implies understanding exactly what has to be done, which also lessens the uncertainty of not knowing how to manage the material or the learners. Lesson preparation was valued by both inexperienced and seasoned teachers for the teaching and learning of their learners. Agricultural Sciences teachers can save time and efficiently manage and arrange their teaching materials by using lesson plans. Participant Agricultural Sciences felt that their lesson planning had a favourable impact on learners' education. Therefore, they believed that a lesson plan should be created such that it gives the teachers and learners the essential knowledge. Lesson plans should include every element of a lesson and offer the learners a subway for learning. Experienced teachers seemed more adaptive to the shortage of teaching and learning resources compared to novice teachers. Therefore, there is a need for the two to engage on how to best serve the learners in Agricultural Sciences.

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APPENDIX A

NON-PARTICIPATION OBSERVATION CHECKLIST

Name of the school: _____

Use cross (X) to complete the table

Type of resources/ items	**Good (Yes)**	**Bad (No)**
1) Enough Agricultural Sciences teachers		
2) The way the lesson was introduced by the teacher		
3) The teaching method used in the classroom		
4) Was the lesson presentation satisfactory?		
5) How is the teacher facilitating the learning activities?		
6) Agricultural Sciences textbook/ teaching and learning resources availability		
7) The proper seating arrangement of learners in the classroom.		
8) The normal number of learners in the classroom		
9) Chalk and chalkboard		
10) Agricultural Sciences posters in the classroom		
11) Are Learners actively participating in classroom		
12) Conducive classroom environment		
13) The discipline of learners in the classroom		

14) Various teaching and learning methods in the classroom during teaching and learning		

Field Notes

1. The type of teaching method used during teaching and learning……
   ……..
2. How did the teacher introduce the lesson on Agricultural Sciences……
   ……
3. How is the teacher presenting the lesson……
   ……
4. How is the teacher facilitating the learning activities……
   ……
5. Are learners actively involved (learner's participation during teaching and learning)……
   ……
6. How does the teacher facilitate the assessment activities……
   ……
7. How did the teacher conclude the lesson on Agricultural Sciences……
   ……..

APPENDIX B

INTERVIEW QUESTIONS FOR AGRICULTURAL SCIENCES TEACHERS

Name of an interviewer: _____

Place of interview: _____

Date of interview: _____

Questions:

1. Do you prepare lessons in Agricultural Sciences before going to the classroom?
2. What challenges do you encounter when planning lessons on Agricultural Sciences?
3. What challenges do encounter when presenting lessons of Agricultural Sciences?
4. If you do prepare an Agricultural Sciences lesson, how often do you prepare?
5. Can you tell me how these challenges affect the teaching and learning process of Agricultural Sciences in the classroom?
6. How do you feel about the challenges faced during lesson preparation and presentation for Agricultural Sciences daily as a teacher?
7. Do you think these challenges have an impact on the results of learners in Agricultural Sciences?
8. How do learners react in the classroom due to these challenges faced during the teaching and learning process of Agricultural Sciences?
9. Is the learner's behavior part of the challenges faced during teaching and learning?
10. How is the support in school for teaching and learning resources in Agricultural Sciences?
11. How do you think these challenges can be addressed to have a smooth lesson preparation as well as teaching and learning of Agricultural Sciences?

APPENDIX C

University of Limpopo

Private Bag X1106,
Sovenga, 0727

Polokwane, 0727

7 February 2023

Limpopo Department of Education

P. O Box 561

Polokwane

0727

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOLS

My name is Shibambe Left, and I am a school of education student at the University of Limpopo in Polokwane. The research I wish to conduct for my Master's thesis is titled: **Teachers' challenges and experiences when planning and presenting Agricultural Sciences theory and practical lessons in Lebopo circuit, Capricorn south district, Limpopo province, South Africa**. This project will be conducted under the supervision of Dr. MF Masha of the University of Limpopo, South Africa.

I am hereby seeking your consent to conduct my study at your school.

I have provided you with a copy of my research proposal which includes copies of the measure and consent forms to be used in the research process, as well as a copy of the approval letter which I received from the University of Limpopo Research Ethics Committee (Human).

Upon completion of the researcher, I undertake to provide the Department of Education with a bound copy of the full research report. If you require any further information, please do not hesitate to contact me on 078 941 1371 and 201219160@keyaka.ul.ac.za Thank you for your time and consideration in this matter.

Yours sincerely,

Shibambe Left

University of Limpopo.

APPENDIX D

University of Limpopo

Private Bag X1106,
Sovenga, 0727

Polokwane, 0727

7 February 2023

The Principal

P. O Box 561

Paledi

0892

Dear Principal

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR SCHOOL

My name is Shibambe Left, and I am a school of education student at the University of Limpopo in Polokwane. The research I wish to conduct for my Master's thesis is titled: **Teachers' challenges and experiences when planning and presenting Agricultural Sciences theory and practical lessons in Lebopo circuit, Capricorn south district, Limpopo province, South Africa.** This project will be conducted under the supervision of Dr MF Masha of the University of Limpopo, South Africa.

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Upon completion of the researcher, I undertake to provide the Department of Education with a bound copy of the full research report. If you require any further information, please do not hesitate to contact me on 078 941 1371 and 201219160@keyaka.ul.ac.za Thank you for your time and consideration in this matter.

Yours sincerely,

Shibambe Left

University of Limpopo

APPENDIX E

CONSENT TO PARTICIPATE IN THIS STUDY

I,_____(participant Name), confirm to give my consent to take part in this research. The researcher has told me about the nature, potential benefits, procedure, and anticipated inconvenience of participation.

I have read or explained to me all the necessary information I may need to know about the researcher. I have had enough time to ask questions and am ready to participate in this study. I understand that my participation in this study is voluntary and I am free to withdraw anytime without penalties. I am made aware that the findings of this study will remain anonymously used and processed in a research report, journal publication, or conference proceeding.

I agree to the recording of the insert-specific data collection method.

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

Signature of participant:_____Date: _____

Full Names of Researcher: _____

Signature of researcher:_____Date: _____

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: tukiso.moloantoa@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: **29 October 2024**

PROJECT NUMBER: **TREC/1700/2023 - Amended**

PROJECT:

Title: Educators' challenges and experiences when planning and presenting Agricultural Sciences theory and practical lessons in Lebopo circuit, Capricorn South district, Limpopo province, South Africa
Researcher: L Shibambe
Supervisor: Dr. MF Masha
Co-Supervisor/s: Prof. MS Mtshali
School: Education
Degree: Masters in Science Education

PROF D MAPOSA
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**
ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**
iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

APPENDIX G

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

CONFIDENTIAL

Ref: 2/2/2 Enq: Makola MC Tel No: 015 290 9448 E-mail:MakolaMC@edu.limpopo.gov.za

Shibambe L
P.O Box 3353
Giyani
0826
shibambehl@gmail.com

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct research has been approved. Full title of the research project**: "An Exploration of educators' experiences and challenges when planning, presenting theory, and practical lessons in Agricultural Sciences, Lebopo Circuit, Limpopo Province".**
3. The following conditions should be considered:
   - 3.1 The research should not have any financial implications for Limpopo Department of Education.
   - 3.2 Arrangements should be made with the Circuit Office and the School concerned.
   - 3.3 The conduct of research should not in anyhow disrupt the academic programs at the schools.
   - 3.4 The research should not be conducted during the time of Examinations especially in the fourth term.
   - 3.5 During the study, applicable research ethics should be adhered to, the principle of voluntary participation (the people involved should be respected).

Cnr 113 Biccard & 24 Excelsior Street, POLOKWANE, 0700, Private Bag X 9489, Polokwane, 0700

3.6 Upon completion of research study, the researcher shall share the final product of the research with the Department.

4 Furthermore, you are expected to produce this letter at Schools/ Offices where you intend conducting your research as an evidence that you are permitted to conduct the research.

5 The department appreciates the contribution that you wish to make and wishes you success in your investigation.

Best wishes.

16/01/2024

Dr.Makola MC **Date**

Director: IPR & R

16/01/2024

Mashaba KM **Date**

DDG: CORPORATE SERVICES

Cnr 113 Biccard & 24 Excelsior Street, POLOKWANE, 0700, Private Bag X 9489, Polokwane, 0700
Tel:015 290 7600/ 7702 Fax 086 218 0560

APPENDIX F

WriteRight Language Editing Services
640 Munnik Avenue, Bendor, Polokwane, 0699
Registration No. 2023/162786/07
moffatsebola@gmail.com, 0697110718
DATE: 08 November 2024

Re: Certificate of Editing

I hereby advise that I edited a research dissertation titled: "**TEACHERS' CHALLENGES AND EXPERIENCES WHEN PLANNING AND PRESENTING AGRICULTURAL SCIENCES THEORY AND PRACTICAL LESSONS IN LEBOPO CIRCUIT, CAPRICORN SOUTH DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA**" by **Left Shibambe**. My editorial interventions entailed, among other aspects, the following:

- English academic language editing, including grammar, spelling, tenses and subject/verb agreement. Efforts were made to ensure that UK English instead of US English was used consistently in the text. Therefore, verbs such as "organize", "emphasize", "realize" and "behavior" were spelled thus, "organise", "emphasise", "realise" and "behaviour", respectively.
- Style and full reference editing according to the Institution's style guide. Here, I checked consistency in the formatting of in-text references and the list of references, including checking that all the sources cited in text were duly acknowledged and that all the sources on the list of references appeared in the text. Addressing inconsistencies in the use of font types and sizes throughout the document.

Please note that I have not had sight of the manuscript since editing, with Left either accepting or rejecting suggested changes or corrections, as is usual. Unless tampered with prior to your reception of the edited work, I trust you will find the editing quality in order.

Regards
Dr Moffat Sebola,