UNIVERSITY of the
WESTERN CAPE

Masters in Education (MEd) – Mathematics Education

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Title: Exploring Shifts In Teachers' Perspectives Of Reflection In A Context Of CPD Using Video-Stimulated Recall

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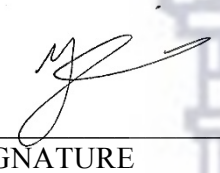
Keywords: Professional Development · Video-Stimulating Recall · Reflection · Teacher Perspectives · Green Centric Reflection Model ·Qualitative Research·

DECLARATION

I declare that EXPLORING SHIFTS IN TEACHERS' PERSPECTIVES OF REFLECTION IN A CONTEXT OF CPD USING VIDEO-STIMULATED RECALL is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.



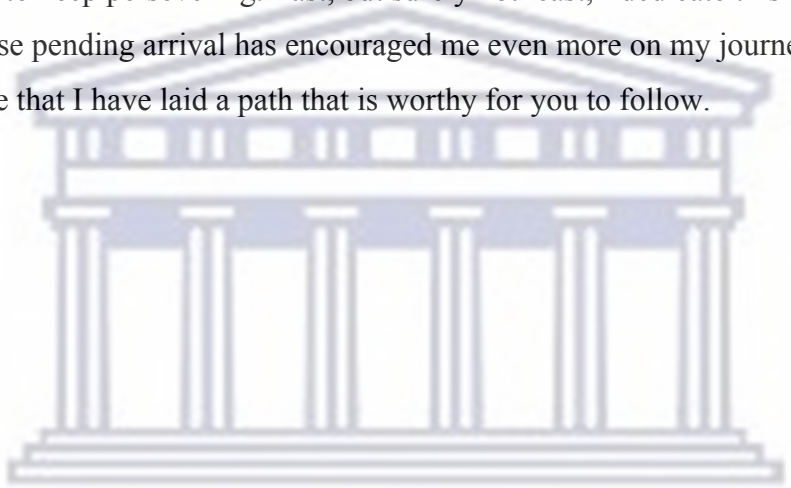
16 / 01 / 2023

SIGNATURE DATE

Yasser Slamdien

Dedication

I dedicate this work to my parents, Taliep and Shiraz Slamdien, who have encouraged and supported me through my journey, and whose life of sacrifices have allowed me to follow this academic path. Your hard-work and ethics have encouraged me to always strive for success in life. I would also not have been able to manage without the support of my wife, Serena Slamdien. Your patience and understanding throughout my journey have been unmatched and has motivated me to keep persevering. Last, but surely not least, I dedicate this work to my unborn child whose pending arrival has encouraged me even more on my journey of seeking knowledge. I hope that I have laid a path that is worthy for you to follow.



Acknowledgments

Acknowledgement and appreciation are given to everyone who was involved in this study:

- The mathematics team and teachers involved in the study from both schools. Thank you for stepping out of your comfort zones and sharing your time by being involved with this study.
- My supervisor, Dr Benita Nel: Thank you for believing in me. I appreciate all your support, patience, encouragement and understanding throughout my studies.
- The MEd team: I appreciate the ideas and criticisms shared in the duration of this study.
- The National Research Foundation for the financial support which made this project possible.
- The University of the Western Cape: for allowing me this opportunity to be a part of the MEd programme.
- The Western Cape Education Department: for permitting me to conduct the study, and collect data, in the public schools.

Abstract

Reflective practice is understood as being a vital part of professional development and is seen as a necessary skill in mathematics teaching. The poor mathematics results in South Africa can be addressed by supporting mathematics teachers to reflect more effectively. This study focused on how exposure to Video Stimulated Recall (VSR) affected mathematics teachers' perspectives of reflection and their practice, and to what extent teachers developed, after exposure to VSR. The aim was to gain a better understanding of how teachers reflect and develop through reflection. The research question which guided the study was: How, and to what extent, does the exposure to VSR affect the mathematics teachers' perspective of reflection? The sub-questions which accompanied this question were: 1. How, and to what extent, did the exposure of mathematics teachers to VSR, shift their perspective of their own practice? 2. How, and to what extent, did the mathematics teachers develop through their exposure to VSR as a reflective tool? The study was conducted in two public primary schools in the Western Cape and focused on two mathematics teachers from each school. This resulted in having four mathematics primary school teachers participating in the study. The study was based on a qualitative research design. Data was collected through questionnaires, two cycles of video-recorded lessons, followed by video-stimulated interviews. The theoretical framework which guided the study was based on the Centric Reflection Model (Green, 2006) and focused on an egocentric perspective of reflection. The study found that exposure to VSR influenced teachers to shift their perspective of reflection towards the egocentric perspective. The participants appeared to become more aware of their own practices through exposure to VSR, resulting in shifts of their states of development. Some of the challenges that the researcher encountered were teachers being reluctant to reflect, and teachers not being involved in all processes of the study for the full duration of the study period, as well as the restrictions posed during the Covid-19 pandemic when data collection occurred. Recommendations included the continuous usage of VSR as a reflective tool by teachers themselves, and with the mathematics subject team to spearhead more effective reflective practice among mathematics teachers.

Abbreviations

VSR	- Video-Stimulated Recall
WCED	- Western Cape Education Department
CPD	- Continuous Professional Development
UWC	- University of the Western Cape
COVID-19	- Coronavirus disease 2019
S1	- School 1
S2	- School 2
T1	- Teacher 1
T2	- Teacher 2
T3	- Teacher 3
T4	- Teacher 4

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Chapter 1 Introduction and Overview

1.1 Introduction

Continuous Professional Development (CPD) is a very necessary part of a developing teacher. The Teacher Development Summit of 2009 explains that the aim of developing teachers is ultimately for the improvement in teaching of the curriculum (ELRC, 2009). This means that a developing teacher is an individual who seeks to improve on his/her delivery of the curriculum. According to the Organisation for Economic Co-operation and Development (OECD), CPD for teachers is defined as a range of activities that is intended to develop teachers' skills, knowledge and expertise (OECD, 2009). CPD is further defined as consisting of programs which are systematically intended to influence a change or improvement in classroom practices of teachers, as well as their attitudes and beliefs (Guskey, 2002). Knowledge around the world is growing at an increasing pace, and this means that teachers should continuously be monitoring and enacting their professional growth, in order to stay abreast and relevant to their context. A very important factor that needs to be considered before a teacher incorporates progressive methods of teaching, is evaluating and reflecting on their current methods of teaching (Pellegreno & Gerber, 2012).

Evaluating their learners' performance and reflecting on their current methods of teaching, allows the teacher to identify which aspects are useful and which aspects need more development (Tlali, 2019). Video Stimulated Recall (VSR) is a reflective tool which allows a teacher to relive certain events and situations in the classroom, providing the teacher with the necessary stimuli needed in order to accurately reflect on it (Gazdag, Szivak & Nagy, 2019). The practice of VSR allows for the recording of a teacher's lesson that is being taught, in order to replay and reflect on it thereafter. This method of reflection allows the teacher to reflect on what had transpired during the lesson in real time, and possibly re-evaluate why certain aspects of the lessons were done/planned in a certain way. Often when we try to recall events that had already occurred, many of our memories do not capture every single detail of the event and context (Lyle, 2003). VSR captures the moment and allows the teacher to completely replay the lesson and reflect on everything that occurred. This practice of VSR could help teachers in sustaining a reflective practice with regards to their teaching. Reflection could allow teachers an insight into why a lesson went in a certain direction and could assist them in planning their lessons better in future. We also have to take into consideration that often we do things without being aware of it, as well as the manner in

which we are doing it. An example that can be used is when a learner asks a question in class and the teacher reacts to that question in a negative manner without being aware of his/her reaction. The teacher subsequently may also create assumptions as to why the learner is behaving negatively. The use of VSR could allow the teacher to revisit the moment in class with an open mind and understand why it had played out the way it did. This understanding could allow the teacher to reflect on their reaction, and why they reacted in that specific manner, but also to devise ways in which their reaction can be improved. VSR, as a reflective process, also allows the teacher to direct their own CPD, focusing on aspects that are relevant to their context (Carper et al, 2009) and needs. It puts the teacher in the driving seat of their own development, customized to their own needs and context.

1.2 Statement of research problem and purpose of study

Luneta (2012) stated that there are CPD programmes that do not pay attention to the needs of teachers, and that teachers themselves should be more involved in the process of developing PD programmes that they are involved in. The issue that teachers are not always in the driving seat of their own development and growth, arises. Some teachers also feel that CPD developers need to take teachers' views and experiences into consideration (Carper et al., 2009). VSR allows for an anecdotal experience by the teacher, allowing the teacher to reflect on their own context. Since video-episodes of the teachers' own classes are recorded and watched by themselves, they are engaging with their own experiences. VSR could allow the teacher to identify and understand their development and growth more easily, as compared to other CPD opportunities where individuals would need to adapt and apply ideas to their own context as needed, and are not necessarily geared for it. According to Radišić and Baucal (2016), when teachers are shown video-recordings of their teaching, they activate contextualised knowledge about their specific classroom and their teaching. According to Mann et al. (2009), most models of reflection include reflecting on experiences and practices that would enable the individual to identify which areas need development. It is important for an individual to be aware of the areas which need development, for improvement and growth to be experienced (Smith, 2015). It is not uncommon that when areas of improvement are identified by others, that it is perceived as a negative experience, where teachers experience being criticized in terms of lacking in specific areas. This type of interpretation of findings distracts the focus of CPD programmes from the intention of teacher development. This (distraction) could be due to CPD programmes within schools focusing more on appraisals than growth. The researcher has experienced this many times in school where teachers are

often evaluated on their effectiveness as teachers, and the focus is not really on identifying areas where a teacher could improve, and grow as teachers, but rather to find faults. Coles et al. (2019) notes that although the purpose intended for VSR practice was not for evaluative purposes, it is often used for this purpose, and this is counter-productive to teacher learning. This could lead teachers to developing a negative perspective towards CPD opportunities and reflective practices. The perspective that an individual has of a specific concept or idea is very important as it could influence the individual's practice of that particular concept or idea.

A definition of 'perspective' is explained by the Merriam-Webster dictionary (2021) as being a mental view, or interrelation in which a subject or its parts are mentally viewed. An individual's understanding of a subject could be influenced by the perspective from which individuals 'view' the subject from. The focus of this study was on teachers' perspectives, and not perception, as the intention was to find out how teachers view reflection through VSR, and not how teachers interpret (perceive) reflection through VSR. The purpose of this study was to investigate teachers' perspectives of the reflection process using VSR, as there was not much data available pertaining to the focus and context of the study. This was done to understand what teachers' perspectives of reflection using VSR are, and to what extent the exposure to VSR affected the teachers' awareness of their own practices. The outcome of this study could assist us in understanding how mathematics teachers in selected schools in the Western Cape, interpret reflection through exposure to VSR, as well as understanding to what extent their exposure to VSR affects their awareness regarding their own practices.

1.3 Aims and objectives of the study

The aim of this study is to gain an understanding of teachers' perspectives of reflection. The reason behind this is that an individual's perspective of something could influence their overall understanding and practice of that concept. The insight of what teachers' perspectives of reflection are, could assist in more effectively guiding teachers with reflective practices. The study also aims to explore whether or not teachers' perspectives of reflection are affected through exposure to VSR, as well as whether they developed through exposure to VSR as a reflective tool. The purpose of this is to gain an improved understanding of how teachers practice reflection with a view to benefit from this study's recommendations in terms of reflective practices for their own teacher professional development. The assumption is that if teachers become more aware of their practices

through reflection, they could continually endeavor to improve on their delivery of lessons and professional development.

1.4 Research Questions

1.4.1 The main research question which directed this study was:

How, and to what extent, did the exposure to VSR affect the mathematics teachers' perspective of reflection?

1.4.2 Sub questions:

a) How, and to what extent, did the exposure of mathematics teachers to VSR, shift their perspective of their own practice?

b) How, and to what extent, did the mathematics teachers develop through their exposure to VSR as a reflective tool?

1.5 What is Video Stimulated Recall:

The introduction of videorecording to assist reflective practice allows individuals to capture every single detail of an event, that could later be used as recall stimuli. VSR is a method of reflective activity that allows the user (in this context, the teacher) to be able to view and reflect on past occurrences to assist in planning for future events. It allows the teacher to notice certain things which occurred during a lesson, which they would not usually notice during teaching, as they are now on the other side of the mirror. Watching the video recordings of their own lessons, it now affords them the opportunity to watch their lessons from another angle and evaluate their lessons from another perspective. It is the act of 'noticing' which is important for teacher development and improved teaching (Schoenfeld, 2011). Choy (2014) further states that the practice of noticing is specifically important for Mathematics teachers as it allows them to pay attention to specific details which could lead to new responses, as well as assisting teachers on how to combine these new responses with their previous knowledge and experience. In effect, this noticing can allow for a new way of reflection.

Reflective practice is an important aspect of becoming an effective teacher (Pellegrino & Gerber, 2012). Reflection used by a teacher allows him/her to be able to examine their own practices in an effort to improve on it for future lessons, or for the enhancement of their learners' learning. This entails the teachers questioning themselves on what was effective

during their lessons, why certain decisions were made by themselves, and how certain decisions, actions or occurrences influenced the lessons. According to Lyle (2003), individuals need a stimulus in order to recall certain thinking patterns. It is quite common that individuals may recall certain events by memory, but not every important detail is captured solely in this manner.

1.6 Theoretical Framework

This study used aspects of Green's (2006) Centric reflection model as theoretical lens. This model focuses on the different perspectives of reflection, namely the egocentric (view of self), allocentric (view of student), and macro-centric (view of professional and content standards). The specific perspective of reflection which this study focused on, was the egocentric perspective, as the interest was focused on finding out if and how exposure to VSR influenced the teachers' perspectives on reflection, and whether exposure to VSR affected the teacher's awareness of their own practice. The egocentric perspective of the model focuses on how the individual views and understands themselves. This perspective relates to everything that the individual (in this context, the teacher) questions regarding themselves. An example of this could be how the teacher viewed their own teaching methods (was it effective?), or how the teacher questioned their own knowledge and actions. The egocentric perspective focuses solely on the questions that arises about the self, such as - "How do I feel? "What expectations do I have? "What was difficult for me?", and "What have I discovered?" (Green, 2006). This perspective purposefully takes into consideration the individual's view about the self (how the teacher views and questions themselves), and not the views of others (what the learner or observer thinks or feels). Since the egocentric perspective focuses on how the individual questions and views the self, this was the most appropriate perspective of the model to apply to this study, as the interest was in finding out how the teacher's own perspective towards reflection was affected through experience with VSR, especially since the practice of VSR focuses on recording the teacher's actions for self-reflection.

Reflection can then also further be broken down into three types: Reflection-for-action, reflection-in-action, and reflection on-action (Green, 2006). The type of reflection that this study focused on was reflection-on-action. I focused on this type of reflection as the researcher was interested in finding out if using VSR influenced the teacher's perspective on reflection, and if exposure to VSR influenced the teachers' awareness of their own practice.

Another reason for the choice was because VSR focuses reflecting on an event (lesson) that had already passed. Therefore, this type of reflection would be best suited for reflecting on an event that had already occurred. Reflection-in-action is a type of reflection focused on reflecting on an action while the action is occurring, and reflection-for-action is a type of reflection which focuses on reflecting on planning for an event that must still occur. Therefore, these last two types of reflection would not be suited to focus on for VSR.

The focus of the questions asked of the teachers when collecting data, focused on how, and to what extent, did the teacher's perspective change towards reflection, after exposure to VSR. Since it focused on the teacher's perspective after an event (exposure to VSR), reflection-on-action was the most appropriate type of reflection to focus on for this study. This study combined the egocentric perspective of Green's (2006) Centric model in focusing on reflection-on-action. The intention was to gain an insight into how teachers view the self, and their perspective towards reflection through VSR. The reflective process was further categorized into the planning, delivering, and evaluating process which all took place after the lessons had been conducted. By using the egocentric perspective to focus on reflection-on-action, the categorized processes could each focus on: Planning process - reflecting on parts of the lesson planning that caused the teacher difficulty; delivering process – teacher reflecting on how the delivery of the lesson went from their view; evaluating process – teacher reflecting on the effectiveness of the lesson from their view.

The intention of focusing on these processes was to assist us in understanding how exposure to VSR influenced teachers' perspectives towards reflection, as well as on awareness of their own practices. According to a study by Tlali (2019), using the egocentric perspective of the Centric reflection model resulted in teachers becoming aware of the perspective of self-evaluation, reflecting on own practices, and possibly using the questions of the egocentric perspective (such as how the lesson went, and why?) to guide future self-evaluations. This is a clear example of the egocentric perspective of the Centric model being used to guide teachers in self-reflection and growth. Dervent (2015), who observed that when teachers reflect through self-awareness, further mentioned that there is a possibility of the teachers improving their skills and knowledge through better understanding. This could be due to the teacher developing an understanding of why they do certain things, and the effects that certain practices result in.

1.7 Context of the study

The study was conducted during the Covid-19 pandemic. Face-to-face interaction had to be monitored carefully and the researcher had to adhere to all Covid-19 protocols. Thus, careful liaising with the school management and the participants were done to ensure the latter. The schools also followed a rotational timetable system where each class was divided into two groups; only one group attended per day. In the event that it was not possible for the researcher to meet face-to-face with the teachers at the respective schools, the use of online interviews was identified as a possibility. Fortunately, that was not necessary as the researcher was able to meet the teachers face-to-face.

School 1 (S1) is a Quintile 5 school. It is categorized as a quintile 5 school because it is situated in an affluent area in Cape Town. According to the National Norms and Standards for School funding (DoE, 2004), this means that the school falls under a category of schools that receives the least amount of funding from the state. The majority of learners, however, come from under-privileged, quintile 1 areas. The school is under-resourced and the classes are crowded. During the time of data collection, South Africa was under a lockdown period, where strict Covid-19 safety regulations had to be adhered to. This included physical distancing between people in a public space. At S1, grades R-5 attended school on a rotational basis, and grades 6 and 7 were expected to attend daily. A handful of learners did not attend school at all for more than a month after schools had reopened, after the lockdown period. The mathematics team at the school appeared to not work together as a supportive unit. It appeared as if there was no professional learning community within the mathematics team. This was further neglected during the covid-19 period, due to the demands of curriculum changes that the teachers had to implement in order to catch up on work missed during the strict lockdown.

School 2 (S2) is a previously disadvantaged school situated in the Cape Flats and is a Quintile 1 school. It is a school-fees free school, and the school is well-equipped with technology which was provided for by the Western Cape Education Department (WCED). The learners attended school on a rotational basis during the Covid-19 period, and learner attendance during this period was quite poor, with a handful of learners also not attending after schools had reopened after the strict lockdown period. The mathematics team appeared to work together as a supportive unit and appeared to not be hindered by the demands of the curriculum changes at the time after the strict lockdown.

1.8 Research design and Methodology

This study used a qualitative research design. Qualitative research designs are used to understand people's beliefs, experiences, attitudes, interactions and perspectives (Anas, 2022). Astalin (2013) describes qualitative research as being a systematic scientific inquiry which seeks to describe social or cultural phenomena for a researcher's understanding of data. A qualitative research design aims to explain the social phenomena under investigation (Hewit-Taylor, 2001) and the purpose is to attempt to understand a research subject, instead of predicting an outcome (Tomaszewski, Zarestky, & Gonzalez, 2022). The study investigated how teachers perceived reflection using VSR, and this is categorised as understanding how teachers perceive a certain process which seeks to understand how humans perceive a process, and is considered a social phenomenon. Therefore, a qualitative research methodology is the appropriate methodology to use for this study as it seeks to understand or describe a teacher's perspective of reflection. As the researcher collected data which helped towards observing and understanding what teachers' perspectives towards reflection were, and not to compare or predict data (as quantitative data does), the design of the study is qualitative. The data was used to gain a generalised understanding of what teachers' perspectives of reflection through VSR were. The study was also pursued to find out if exposure to VSR affected the teachers' awareness of their own practices.

The study was conducted in two public schools in the Western Cape. Each school's Mathematics department was trained as a team in respect of the use of VSR in their respective classrooms. The training was conducted by the researcher. The training consisted of outlining what reflective practice are, the uses and benefits of VSR in the classroom, and how to use the recording equipment involved with VSR. The teachers were trained on how to prepare for the use of VSR as a reflective practice tool in their classroom, and how to use VSR as a means to reflect on their own classroom practice. This training provided the mathematics teams with the skills needed to be able to set up their classroom with the recording equipment, to use the recording equipment effectively to record their lessons in their classrooms, and to be able to understand why VSR is being used in the classroom. The teachers were ensured that this training was for their benefit in personal growth, and not for evaluative purposes. According to Soiferman (2010), methods of collecting qualitative data include observations, interviews and document analyses. In this study, questionnaires, video-recordings of lessons and video-stimulated interviews, were used in the gathering of data.

The questionnaire was used as a qualitative tool for the purpose of ascertaining teachers' understandings of CPD and reflections were.

Each individual in the mathematics team of both schools, respectively, were given a pre-training questionnaire, which delved into their views on reflection before they were exposed to VSR. Two Mathematics teachers from each team of the respective schools were used as case studies to collect data for this study. The two teachers per school were chosen using purposive sampling, and the researcher relied on own judgement to select these teachers in order to collect the necessary data. These teachers were approached to volunteer to be further involved in the study. The volunteers at the respective schools were asked for their lessons to be video-recorded for two cycles. There was a total of one lesson video-recorded per teacher, for every cycle. Each cycle consisted of the following: a video-recorded lesson per participant, after which the video-recorded lesson was watched by both the researcher and participant followed by a video-stimulated semi-structured interview which was conducted by the researcher with the participant to reflect on the recorded lesson. This process was repeated for another cycle.

The entire cycle lasted for a period of no less than two weeks each. The episode that was viewed during this interview was selected by the researcher because of an idea of which aspects would be relevant for data collection to answer the research questions. It is noted that often teachers may be biased and non-critical of their own practices (Coles et al., 2019), and this was taken into consideration when deciding on an episode to view during the interview. Coles et al. (2019) further explains that if the teacher is simply watching the recorded episode on their own, it might not be sufficient for analysing and reflection purposes, and the process is commonly guided by a facilitator (another teacher or in this context, the researcher). A video episode was chosen for, and viewed, during each interview cycle. In the interview the volunteering teachers were probed about their perspective of reflection using VSR, and whether exposure to VSR affected their awareness of their practices.

The interview included questions which can be found in Appendix B. These interviews questions were adapted from the guidelines of Green's (2006) Centric model, focusing on the egocentric perspective of teachers. The interviews were audio-recorded to ensure accuracy of the responses and transcribed thereafter. The interview cycle was repeated, and there was a space of no less than two weeks between the video-recording and the interview per cycle. This timeframe was to allow for video-recording to have taken place

in the classroom, as well as (to allow) enough time for the researcher to have analysed the recorded episodes. The reason that the interview cycle was repeated was so that data could be compared between the teacher's perspective of reflection through VSR pre-interview with the researcher, and the teacher's perspective of reflection through VSR after the initial interview with the researcher. Also, having two cycles of data collection, was to explore whether the teacher developed during the process of being exposed to VSR. Triangulation was done by infusing the questionnaire and interview data, for the purpose of ensuring validity and reliability.

1.9 Data Analysis

This study collected data through questionnaires, video-recordings of two lessons per teacher, followed by video-stimulated interviews. The data was then analysed through the thematic analyses. Braun and Clarke (2012) explained thematic analyses as allowing the researcher to be able to make sense of collective or shared meanings and experiences. Tuckett (2005) described thematic analysis as comparing data judged to belong to a specific theme, in order to recognise or discover a common feature of that theme. Majumdar (2019) describes thematic analysis as a method of qualitative research that forms descriptions and interprets data through themes and patterns noticed in the data set. This means that the data was analysed by being reviewed and themes looked for, that might be noticeable, and then these themes would be grouped into categories. The questionnaires (Appendix A) assisted in gaining an understanding of what the teachers' perspectives were of reflection, so that there was a baseline understanding of the perspectives with which the teachers approached the training. These questionnaires were shared with teachers before the training took place, and they were expected to complete it before the first cycle of interviews took place. The video-stimulated interviews (Appendix B) assisted me in gaining clarity of the teachers' perspectives of reflection through VSR, and to what extent the exposure to VSR affected their awareness of their own practices. The interviews were used in conjunction with the recorded episodes. This means that teachers viewed the recorded episodes of their lessons and responded in the interviews, after having viewed their lessons. The recorded episodes were meant to be used as a stimulus for the teacher to recall the specific highlighted event during the lesson. Viewing the recorded episodes could also assist teachers in being able to view their lessons with 'new' eyes and notice things that they might not have noticed during the lesson (Gaudin & Chailies, 2015).

As mentioned earlier, the interview process was conducted twice so that the two sets of data could be compared. The first video-stimulated interview between the researcher and teacher was done to ascertain the teacher's perspective of reflection through VSR, after viewing the video-footage episodes selected by the researcher. The second video-stimulated interview was done to probe the teacher's perspective of reflection through VSR after the first interview, and to observe (any) changes in the teacher's perspective of reflection through VSR, as well as look for possible development that took place. This was to investigate if there was a shift in awareness of reflection in the teacher. This process used the egocentric perspective of Green's (2006) Centric reflection model, in order to maintain what aspects of reflection of the teacher the data collection would be focused on. The study aimed to assess teachers' perspectives on reflection and VSR, and whether their perspective of their own practices shifted through exposure to VSR. The analysis focused on the teachers' perspectives of their own reflections, and not on how others (observers, learners etc.) perceived them. The analysis focused solely on the teachers' perspectives, therefore the egocentric perspective of Green's centric reflection model was best suited to guide the structure of the data collection and analysis process.

Schratz (2006) further described teachers' reflection process as going through states of awareness, namely: unconscious incompetence, conscious incompetence, conscious competence and unconscious competence. The reason that it is referred to as states and not stages is because it is focused on the current state that the teacher is in during the time of the study, and not focused on the level of development of the teacher, which the word 'stage' would refer to. Unconscious incompetence would be when a teacher was not aware of the limitations that they have, conscious incompetence would be when a teacher was aware of their limitations, conscious competence would be when a teacher addressed previous occurrences through deliberate planning, and unconscious competence would be when new competencies became part of the teacher's way of doing things (Geiger, Muir & Lamb, 2015). The data was presented in the form of questionnaires for the teachers, along with the transcribed interviews. The intention was that this data would clarify what (if any) teachers' perspectives are towards reflection through VSR, and if exposure to VSR affected teachers' awareness (if any) of their own practices.

1.10 Significance of the study

The significance of this study was to explore the shifts in teachers' perspectives of reflection, when exposed to VSR, so that we may understand if exposure to such a program

would influence teachers' perspectives and understanding of reflection in the context of professional development. There appeared to be an issue regarding professional development amongst teachers in South African schools, and there also seemed to be a large misconception regarding reflective practices amongst teachers. The study was conducted in the hope of contributing to an improved understanding of teachers' perspectives on reflection, so that reflective practices may become more effective for professional development of teachers.

1.11 Assumptions and Limitations

The assumption of this study was that the data collected would allow the researcher to gain an understanding of what teachers' perspectives are towards reflection through VSR, and to what extent exposure to VSR affected teachers' awareness of their practices. It was assumed that teachers would be open and comfortable enough to share their perspectives, and willing to practice VSR as a means of reflective practice. A limitation that I envisaged was that teachers would not feel comfortable handling and operating the recording equipment. This occurred in one of the teacher's classes, and I had to set up and handle the recording equipment myself. There was also a possibility that teachers would not feel comfortable being recorded on video-camera and might not be 'themselves', thus affecting the authenticity of the footage and reflection that would be performed on the footage. This could be seen as a limitation, as authentic footage was needed for the teachers to be able to make an effective reflection. Another limitation was the language of the teachers from S2. The participants felt more comfortable communicating in their home-language, Afrikaans, and as I am from an English home-language background, I found it challenging to interpret the teachers' responses.

1.12 Timeframes

The first term of 2021 focused on obtaining consent from all involved parties, and arranging all training dates for the second term. Training of teachers took place in the second term of 2021 and ended by the end of the third term. The dates for the recording VSR sessions were arranged for a period not too long after the training session. The collected data was then analysed and interpreted, in order to complete the dissertation for submission by the end of the 2022 academic year. This was achieved by careful time-management, and by organising the completion of chapters in a manner that made it possible to complete the study by the deadline of the end of the 2022 academic year.

1.13 Chapters outline

Chapter	Headings
Chapter 1	Overview of the study
Chapter 2	Literature review
Chapter 3	Methodology
Chapter 4	Data analysis and discussions
Chapter 5	Conclusion, recommendations, and limitations

Table 1: Chapters outline

1.14 Summary of chapter

The intention (and aim) of this study was to investigate what teachers' perspectives were in terms of reflection, and if their perspective of reflection, and their teaching practices, were affected through exposure to VSR. The collected data (pre-training questionnaire, recorded lessons and video-stimulated interviews) were analysed to see what, if any, possible trends were observed. The significance of this study was that it could contribute to the improved understanding of teacher professional development. It aimed to assist in understanding what teachers' perspectives of reflection were, and if exposure to VSR affected their perspective of reflection, and their awareness of their teaching practice. The aim of the study was to contribute towards the possible improvement of teacher professional development.

A copy of this thesis would also be shared with the Western Cape Education Department, as well as both schools involved.

Chapter 2 Literature Review and Theoretical Framework

2.1 Introduction

This chapter discusses literature pertaining to VSR and teacher reflection. It will focus on, and discuss the following aspects:

- Mathematics Teacher Continuous Professional Development (CPD)
- Reflection and Video-stimulated Recall
- CPD and Technology
- Teacher CPD and their perspectives thereof
- Teachers' perspectives of reflection and CPD activities

2.2 Mathematics Teacher Continuous Professional Development through reflections

Mathematics teachers are not exempt from having to constantly review their practices and to attempt to identify areas of their practices that need development. Reflection is discussed as being an aspect which contributes towards mathematics teachers' development and elaborates on teachers' beliefs that influence their classroom practices and professional development (Schultz et al., 2020; Nian, 2020). When Nian (2020) mentions teachers' beliefs, this could also be understood as involving teachers' perspectives, as the latter could greatly influence a teacher's practice. It is of note that it is important for teachers to be aware of their beliefs and practices, as this affects and influences their learners in the classroom. It is important that teachers always reflect on their teaching practices in mathematics, as it is a subject which requires that teachers have reflective thinking skills, to effectively reach the objectives of mathematics education (Yazlik, Gedik & Kaya, 2022). This means that teachers are expected to use reflective thinking to find solutions to problems that arise from lessons and interpret the experiences that derives from a lesson. This is explained as reflection being a manner in which individuals observe, evaluate/interpret and attempt to make improvements regarding themselves. If we consider the objectives of mathematics education, we understand that one of the objectives could be seen as developing a mathematics learner who is skilled and competent in the subject in the current context. This is interesting, as the subject of mathematics is a subject that learners commonly struggle with, and they generally continue to struggle in mathematics and often lose confidence. It is therefore important for teachers to

engage in reflection about their lessons and practices, to be aware of these struggles that learners experience in their classrooms, and to make attempts in order to engage more effectively with these struggling learners during lessons; teachers should not limit engagement to the learners who are talented in mathematics (Khoo et al., 2022). It is further discussed by Khoo et al. (2022) that further research on mathematics teachers from other perspectives (different studies focusing on various aspects of mathematics teachers' development) could provide more valuable insight into assisting the development of more effective mathematics teachers. The intention of this study was to contribute towards the understanding of how mathematics teachers develop.

2.3 Reflection and Video Stimulated Recall (VSR)

For VSR to be incorporated effectively, teachers need to understand the benefits of the use of VSR. It should also be understood that VSR is to be used as a tool to assist in understanding and identifying aspects of their teaching which could be developed further. Since the purpose of VSR is for self-reflection, there needs to be an understanding of what reflection is. The basic understanding of the word 'reflect' includes the synonym 'mirror'. When somebody looks at themselves in a mirror, they are looking directly at themselves as if from the outside – in this case the reference is the other side of the camera lens. Reflection is defined by Helyer (2015) as being associated with 'looking back' and examining past events in order to learn from what had happened, and perhaps plan for future events. Reflection, however, is much more faceted than simply looking back. It may be useful in reflective practice to be able to reconcile "looking at" and "looking back". The individual needs to be able to look back at a past event, while looking at their own practices. The process does not simply require that the individual "looks back" at a certain event, but to also to "look at" themselves during that event. Mann et al. (2009) links reflection to being similar to critical thinking. This could be interpreted as reflection being the process of thinking deeply and critically about a topic or theme, in order to gain a better understanding. Mann et al. (2009) further discusses reflection as being a process which is stimulated by an awareness of a need or disruption in daily practice. This could mean that reflection occurs around a topic when awareness is brought to that topic. It is very common to act without thinking, and sometimes when an awareness of a specific action is brought to one's attention, reflection occurs. Çimer, Çimer and Vekli (2013) describes reflection as an activity in which one explores experiences and learns from it; it is a good attribute and activity, to improve a teacher's practice and

learning. Donald Schön (1983) theorised that reflective practice is part of constructivist thought, and reflection can take place before, during, and after an event has occurred (Sellars, 2013), with the event in this case being the mathematics lesson.

Green (2006) described The Centric Reflection Model as an aid for teachers to assist in focusing on a specific kind of reflection for the purpose of developing different aspects of the lesson. The model highlights three different perspectives, namely, the egocentric perspective, the allocentric perspective, and the macro-centric perspective. The egocentric perspective focuses on the teacher's own perspective, and an example of this is how their practices may affect learners in their class. The allocentric perspective is based on how the learner experienced the lesson, and an example of this would be to focus on the different learning styles that various learners in the class may require. The macro-centric perspective focuses on the more technical aspects of the lesson, and an example of this could be when a teacher focuses on the lesson planning and state-policy requirements of the lessons. These different perspectives allow the teacher to focus on and develop in those specific areas. The centric reflection model aids the teacher in being able to focus on a specific type of perspective, to develop in that area of their practice. The Centric Reflection Model further highlights three types of reflection respectively referred to as reflection-for-action, reflection-in-action, and reflection-on-action (Green, 2006). Reflection-for-action is seen as the process of reflecting while preparing for a lesson. This may take the form of giving much consideration while setting up your lesson plans. Reflection-in-action can be seen as the process of reflecting while you are teaching, 'taking a step back' and reviewing what you are currently doing. Reflection-on-action can be seen as reflecting of a lesson after it has been done. This study focused on reflection-on-action, as it focused on events that had already taken place (the recorded lesson). The reason that reflection-on-action was focused on, was to make teachers aware of their practices (watching the recording) and observe their development, based on their reaction/ reflection of the past event.

Now that reflection has been described and outlined in this context, VSR will be linked to reflection. Pellegreno and Gerber (2012) describe the use of reflecting using video-recordings as encouraging reflective behaviour. They further state that video-recordings allow a teacher to further examine and investigate their classroom practice. Muir (2010) states that research indicates that VSR enhances reflection. This is a clear indication of the benefits of using VSR as a means of reflection in the classroom. Researchers further state that VSR could be used to assist a teacher in noticing significant mathematical occurrences (Muir,

2010; Davies & Walker, 2005). It is natural for a teacher not to notice every single occurrence in the classroom, whether it may come from the learner or from the teacher's own practice. Therefore, they need to devise means to be able to notice occurrences in their classrooms. VSR assists the teacher in 'going back' to view what had occurred, in a manner to gain a better understanding of their own situation/practice, or to notice aspects that they might not have noticed before (Philipp et al, 2007; Geiger, Muir and Lamb, 2016). This form of reflection assists the teacher in seeing themselves in the way that others do and allows the teacher a closer look from this perspective. They are therefore on the other side of the video camera lens and see themselves from another angle this enables them to direct their own development where there might be a need for improvement. The exposure of teachers to VSR, allows them to reflect on their practices and observe where changes could be made (Gaudin & Chalies, 2015). This allows the teacher to observe professional issues from a personal point of view in a familiar context.

The familiar context refers to the teachers' own classroom, with their own learners and within their own school. The familiar context is important as it might assist the teacher in identifying areas of their own practices, in their own classroom by themselves. This means that a familiar, personal context allows the teacher to be able to identify and apply possible changes in a personal manner, that is relevant to their context and needs. According to Biccard (2019), it is often difficult for teachers to implement what they had learnt in workshops, as it rarely takes into consideration the context that the individual teachers practice within. With VSR, the teacher will not have to interpret a model to suit their classroom dynamics. Instead, they will be observing themselves as a 'third person'. This style of observation might make the teacher conscious of things that they would not normally notice (Gaudin & Chalies, 2015). The use of VSR in the classroom for reflective purposes can assist the teacher in identifying areas themselves, that they need to improve on. It is beneficial to continue this practice and to continue reflecting on their own teaching practice, even when success has been experienced in the classroom (Tlali, 2019).

Although a teacher may have experienced a particular situation, or had success in a particular lesson, the details of the situation and context may change in future. The process of reflection can assist the teacher in awareness of their practices and how it may be adapted to different contexts. Although a teacher may be successful in engaging with a particular group of learners, the teacher may not be successful with a different group, or at a different school in a new environment. Therefore, it is important for teachers to reflect on, and be aware of their practices from their own perspective, on a regular basis. Reflection through VSR could

assist teachers in developing these states of awareness in their practices. Geiger, Muir and Lamb (2015) further suggest that teachers' attempts to improve their practice are mostly related to how they are seen by others, instead of how they see themselves. This should be changed. There are many times that we perform actions unconsciously, and are not aware of it, but it is these actions which form part of how we are seen and understood by others (in this context, and how teachers are seen by their learners). The process of VSR could allow the teacher to see themselves as others do, as they will be watching footage of themselves, and this could allow the teacher to observe themselves as an 'outsider'. This type of self-observation could allow them to become aware of things that they would not usually become aware of if they had to self-reflect without VSR.

2.4 Teacher Continuous Professional Development and their Perspectives thereof

During the Teacher Development Summit of 2009, it was decided that an Integrated Strategic Planning Framework for Teacher Education and Development in South Africa needed to be developed, focusing on the years 2011 – 2025 (ELRC, 2009). The technical report called for the new, integrated national plan for teacher development to define clear roles between the stakeholders for the improvement of teacher development (ELRC, 2009). This suggests that teachers need to be involved in the process of developing activities and content for teacher CPD. The technical report further described teacher development as being badly coordinated, poorly monitored, confusing and burdensome. It was found that neither teachers nor district officials have the capacity to manage the different CPD programs, which could slow down the rate of development opportunities for teachers (ELRC, 2009). The report further states that teachers should be at the centre of teacher development activities, as the development of these CPD programs should involve those who will be using it. These factors have the potential to influence teachers' perspectives towards CPD opportunities and could result in teachers' development becoming stagnant. VSR has the potential to avoid teachers' development from stagnating but it remains important to first know what teachers' perspectives are towards reflection through VSR. It was stated that international teacher development practices agreed that CPD for teachers can boost learners' achievement as long as the programs are sustained and relevant to the contexts of the teachers themselves (ELRC, 2009). As mentioned by D' Ambrosio, Harkens and Boone (2004), CPD programs need to be sustained opportunities in order for development to be successful. Major development cannot be expected from once-off CPD programs. If teachers were to remain stagnant in their

development as educators, there would be no real progress in school education, and this would result in a lower quality of education for learners (Chirinda & Barmby, 2017). To assist in the professional development process, school districts and managers make various workshops available for teachers to attend in order to learn new knowledge, or to further develop the skills that they are expected to have (Chirinda & Barmby, 2017). Although a number of workshops are made available each term for teachers to develop professionally, there is the problematic factor of the teachers' perspectives towards these workshops (Wehbe, 2019). There are many teachers across the nation who has negative perspectives towards workshops and CPD (DBE & DHET, 2011) and there are various reasons for these negative perspectives. Attending workshops for CPD is seen as a burden by some teachers who have an already busy schedule, and other teachers feel as if they do not receive sufficient support to sustain the process of development (Guskey, 2002; DBE & DHET, 2011). Many teachers have the understanding that the purpose of CPD is to measure their performance, and not as a means to grow professionally (Luneta, 2012), hence the reluctance to fully commit to CPD activities as teachers might feel more as an "object" than an equal partner, when CPD activities are designed and implemented. Teachers need to be in the driving seat of their own development.

2.5 CPD and Technology

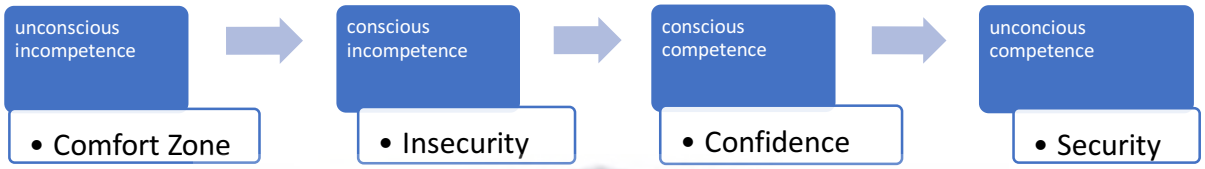
According to D' Ambrosio, Harkens and Boone (2004) CPD is effective if sustained opportunities are provided for individuals to continue developing. The emergence of technology, as well as its availability, allows us to provide or access CPD opportunities at our own convenience, with many online facilities providing opportunities for teachers to develop their skills and knowledge (Wehbe, 2019). This facilitates development as this form of opportunities is more easily accessible and convenient in the individual's own time. This means that teachers may conduct developmental activities at their own convenience without having to wait for scheduled, school-based developmental opportunities. The introduction of VSR allows teachers to reflect on teaching on a much more personal level, as they will be observing themselves on video and reflecting on their teaching. As mentioned previously, it is sometimes difficult for teachers to incorporate what they have learnt in workshops, into the classroom (Biccard, 2019), as some workshops do not take the individual classroom context of the participants into consideration. Contexts may differ between participating groups, schools, and educational districts and teachers. This might make the incorporation of what was learnt in workshops, very difficult to implement in your own classroom. VSR allows

teachers to regularly observe themselves, reflect on their practices and make changes themselves where necessary. This continuous process of reflection allows for true CPD as opposed to some workshops and courses, which are not necessarily continuous (as it might be once-off) and defeats the purpose of teacher development (Beswick & Muir, 2007). The development of sustained CPD programs which can be used at teachers' own paces, needs to be enhanced. Although technology can often be a feared concept to some teachers, Gazdag, Nagy and Szivak (2019) argued that VSR can be used effectively for CPD and provides a safe environment for reflection and development of the teacher through the use of technology.

2.6 Teachers' perspectives of reflection and CPD activities

Teachers' perspective of reflection becomes an important factor in the effective incorporation of VSR, as it is the teacher's reflection on their lesson observations, that are needed in order for them to be able to benefit from it. If VSR can be incorporated effectively, for teachers to reflect on their classroom practice, this could result in teachers constantly being aware of their practices; thus, it would enhance a culture of reflective practice. Biccard (2019) discusses how teachers may use reflection in the classroom in order to improve on their practices, and how their learners react to their practices. Biccard (2019) further discusses successful professional development programmes as focusing on communication, engagement in activities, learner centeredness, as well as focusing on the classroom context. Therefore, it is important that CPD allows for these factors to be transferable in the individual teachers' classrooms. This could be interpreted as reflection in the classroom requiring the teacher to think consciously about their practices, and the effects thereof. Reflection could assist the teacher in knowing whether or not their methods are effective in the classroom. It is advisable that this process of reflection in the classroom has to be an ongoing practice as the teacher needs to continuously reflect on the effects of their practices. Schratz (2006) described teachers' development process, shown below in Figure 1, as moving through states of awareness from unconscious incompetence to conscious incompetence, then to conscious competence and finally to unconscious competence.

Unconscious Incompetence to Unconscious Competence



Note. *Figure 1* adapted from "Leading and Learning: 'Odd Couple' or Powerful Match? by Schratz, M (2006). *Leading & Managing*, Vol. 12, No.2, 2006, pp.46

The unconscious incompetence state refers to when an individual is not aware of what they are not practicing. This could refer to a teacher who is not aware of what they 'lack,' and is seemingly not developing. The conscious incompetence state is when an individual becomes aware of the areas which they could develop in and begin understanding that their practices require improvement. This could refer to a teacher who becomes aware of the areas of their practice that requires improvement or development. This is also called the state of insecurity, as the teacher is leaving their comfort zone and becoming aware of areas in need of development. As the individual develops through the conscious incompetence state, they could work towards the conscious competence state. This could be described as a teacher improving in the areas that they have identified for development, and subsequently becoming aware of themselves confidently improving their practices. This state of confidence has a teacher constantly working on their development, as they are aware that it will benefit their practice. The final state described by Schratz (2006) is the unconscious competence state. This could be understood as an individual's intentions of development becoming almost 'second nature'. As this state of development becomes second nature, the individual integrates it into their general practice, allowing them to practice in a state of security. As a teacher works their way through the stages of development, they often need to remind themselves of the necessary steps that need to be taken. Once they've reached the unconscious competence state, it would no longer be necessary to follow the initial steps as it becomes a part of their identity (Schratz, 2006).

2.7 Conclusion

Once a teacher has an awareness of their practices and have observed themselves with a critical eye, they have an indication of what they can focus on to enhance their practice. In theory, VSR appears to be an effective means to assisting a teacher with reflection. However, it is important to understand what teachers' perspective of reflection is. There is a great deal of research based on VSR and reflection in the classroom, but there is not much research based on examples of teachers' perspectives about it. Therefore, this research intends to highlight an aspect of teachers' perspectives in the context of VSR and reflection, specifically what teachers' perspectives of reflection through VSR are, and to what extent the exposure to VSR shifted their perspective of their own practice in any way. This study focused on mathematics teachers CPD and reflection, through the use of VSR. The intentions of the study were to attempt to understand what teachers' perspectives are on reflection, and if exposure to VSR affected their perspective of reflection, as well as affect their awareness of their practices. It was understood that the teacher's perspective of reflection would influence their view and understanding of it, and this would in turn influence their classroom practice. The development of this process was also observed to see if VSR affected the teachers' development as well. This (perspective of reflection) was used as a baseline understanding of teachers' perspectives. The teachers were then observed to see if their awareness and perspective of reflection, as well as their own practices, were affected after exposure to VSR. The study's aim was to observe if this resulted in any development. The following chapter will describe the methodology of this study.

Chapter 3 Methodology

3.1 Introduction

This chapter discusses the methodology used to conduct this study. It will outline how each step of the study was planned, and the reason for that decision. The researcher's aim was to collect data that would gain insight into a certain field, interpret the data and possibly find trends or patterns that would assist in gaining insight into answering the research questions under investigation. The field under investigation was mathematics teacher profession development, with the focus placed on the development of teachers after exposure to VSR. This was chosen to understand the perspective of teachers on reflection, and if their perspectives were affected after exposure to VSR. The results of this study were intended to possibly gain an understanding on the perspectives that teachers have, on reflection, and how, if any, changes were put into effect after exposure to VSR. The intention of the study was to possibly contribute towards improving mathematics teacher professional development.

3.2 Research Design

This study used a qualitative approach. Qualitative research designs are useful in understanding beliefs, experiences, attitudes, and interactions in attempts to describe social phenomena for improved understanding of the field (Anas, 2022; Astalin, 2013). This study attempted to gain an understanding of what teachers' perspectives were on reflection, and this links to understanding a belief, attitude and experience (in the classroom). A qualitative research design was chosen over quantitative research designs as the researcher was interested in gaining an understanding of how teachers reflect, instead of predicting an outcome (Tomaszewski, Zarestky, & Gonzalez, 2022). Qualitative research designs generally collect data in attempts to observe and understand the subject field. Soiferman (2010) mentions methods of collecting qualitative data, including observations, interviews, and document analyses. The data collection tool for this study was a pre-training questionnaire which participants received at the initial training session when the researcher met with the school mathematics team, and video-stimulated interviews. These questionnaires assisted in

gaining an understanding of what the participants perspective was on reflection before commencing with the study. The video-stimulated interviews assisted the researcher in attempting to probe and understand the participants' reflection process. The purpose of this was to provide a baseline understanding of the teachers' understanding and perspective.

Coles et al. (2019) discusses the use of video as being an effective tool for teachers to use for observing a lesson multiple times, as well as allowing the teacher to focus on specific aspects of the lesson for developmental purposes. Coles et al. (2019) further elaborated on the practice of selection of recorded scenes and explained that quite often, individuals may be biased and non-critical towards themselves and their own practices, therefore it would be useful for the researcher to select the data to be discussed and focused on. It is further elaborated on that the fact that the researcher has been critical in facilitating the process, assists with the participants' reflection process. Major and Watson (2018) discusses that it is not enough for a teacher to simply view recorded footage of their lessons and expect development to occur. There needs to be facilitation by a researcher or peer to assist in directing the reflection process. A participant can simply watch the recorded episodes, but the researcher directs the process and probes events that the participant might not have necessarily noticed. In the interview, the participants will be probed about their perspective of reflection using VSR and asked whether exposure to VSR affected their awareness of their practices. The probing was done carefully so as to not influence the participants' way of thinking with 'specific' questions, as this could result in affecting the authenticity and productivity of the participants' responses (Gaudin & Chalies, 2015). The interviews were audio-recorded to ensure accuracy of participants responses, and the interview questions were adapted from Green's (2006) Centric Model of Reflection.

The egocentric perspective was the aspect of Green's centric model, that was applied during the interviews. This perspective of the centric model focuses on how the individual views and understands himself or herself. This perspective relates to everything that the individual (in this context, the teacher) questions, regarding him/herself (Green, 2006). An example of this could be how the teacher views their own teaching methods (was it effective), or how the teacher questions their own knowledge and actions. The egocentric perspective was chosen, as the researcher was particularly interested in investigating if and how exposure to VSR influenced the teacher's perspective on reflection, and whether exposure to VSR affected the teachers' awareness of their own practice. The researcher was particularly interested in finding out how the teacher's own perspective towards reflection was affected

through exposure to VSR, especially since the practice of VSR focused on recording the teacher's actions for self-reflection.

The type of reflection related to Green's (2006) centric reflection model that this study focused on, was reflection-on-action. The researcher focused on this type of reflection as the interest was in investigating whether using VSR influenced the teacher's perspective of reflection, and if exposure to VSR influenced the teachers' awareness of their own practice, and to what extent their awareness was affected. The data that I collected focused on how, and to what extent, the teacher's perspective changed towards reflection, after exposure to VSR. Since it focused on the teacher's perspective after an event (exposure to VSR, and viewing of footage), reflection-on-action was the most appropriate type of reflection to focus on for this study. To reiterate, the study focused on the egocentric type of perspective of Green's (2006) centric reflection model and focused on reflection-on-action type of reflection. The reasoning was that using this perspective and type of reflection would be the most appropriate way in which to gain insight on how teachers view the self, and their perspective towards reflection through VSR.

According to Green (2006), combining perspectives and types of reflection could be helpful for teachers in reflecting on and developing lessons. The reflection on lessons could be further split up into three processes, namely:

Planning process - reflecting on parts of the lesson planning that caused the teacher difficulty.

Delivering process – teacher reflecting on how the delivery of the lesson went from their point of view.

Evaluating process – teacher's view: reflecting on the effectiveness of the lesson.

Focusing on these processes could assist us in understanding how exposure to VSR influences teachers' perspectives towards reflection, as well as awareness of their own practices. During the course of the data collection, teachers seemed to be leaning more towards reflecting on the delivery process, and not reflecting much on the planning and evaluating process. This is an interesting point as this indicates how the teacher reflection links to the egocentric perspective. The delivery process would focus more on how the teacher conveyed a message or brought the content across. The planning process in many cases would not be considered to be related to an egocentric perspective, as there are many

cases of the teacher not being responsible for the planning of the lesson. Some of the subject teams have assigned teachers to do the lesson planning per grade, resulting in some of the teachers not being involved in the planning of mathematics lessons for their classes.

The evaluating process would involve the teacher reflecting on how effective the lesson was according to their view. According to a study by Tlali (2019), using the egocentric perspective of the Centric reflection model resulted in teachers becoming aware of the perspective of self-evaluation, reflecting on own practices, and possibly using the questions of the egocentric perspective (such as how the lesson went, and why?) to guide future self-evaluations. This is a clear example of the egocentric perspective of the Centric model being used to guide teachers in self-reflection and growth, by focusing on the delivery process. Dervent (2015) observed that when teachers reflect through self-awareness, there is a possibility of the teachers improving their skills and knowledge through better understanding. This could be due to the teacher developing an understanding of why they do certain things in a particular manner, and possibly be made more aware of their practices. This could result in teachers then revising their practices.

3.3 Data Collection

According to Lewis (2009), qualitative researchers need to ensure that the information that is recorded and reported is accurate, not oversimplified or misinterpreted. To ensure accuracy and authenticity of data, this study collected data through the completion of questionnaires by the participants, and video-stimulated interviews of the case study samples. The research process was directed by the following steps:

3.3.1 Pre-training

The mathematics teams at each school were given a questionnaire (Appendix A) which was based on their perspective of reflection prior to the training. This was to gain an understanding of what the teachers' perspectives of reflection and reflective practice were before the training.

3.3.2 Training of Mathematics teams - Intervention

The mathematics team was then given an introductory training session on VSR and what the project entailed. This included explaining what VSR is, and how reflective practices could assist in professional development. This process was carried out at two separate schools with their respective mathematics teams.

3.3.3 Recording of mathematics lessons

Two teachers at each school were then purposively selected by the researcher, using his own judgement to make the selection. Once these teachers had given their consent to be a part of this study, lesson recordings were arranged. This was done by the researcher arranging to record a mathematics lesson in the respective teachers' classrooms. A video-camera was set-up on a tripod in the classroom, allowing the camera to capture the lesson and actions of the teacher.

3.3.4 Viewing and selection of scenes

After the lesson recording was completed, the researcher viewed the recorded episodes, and selected scenes from the recordings to discuss with the participant in an interview. These recorded scenes were chosen because of its relevant for the purpose of answering the research questions.

3.3.5 Video-stimulated interviews

Video-stimulated interviews (Appendix B) were conducted individually with the two selected teachers at School 1. Due to logistical reasons, the interviews at School 2 were held collectively. Thereafter the participants were shown the recorded lessons. The interviews were conducted in a semi-structured manner as it would encourage more feedback and data. The researcher felt that a structured interview would result in the participants merely answering the questions that they were asked. The semi-structured interviews gave the researcher freedom to probe the participants further in areas which he felt needed more elaboration. Specific scenes were probed by the researcher to encourage reflection from the teacher. The first interview was assumed to have a participant speaking about a scene that had been 're-witnessed' with new eyes. Their view of the lesson after watching the recorded scenes could have been viewed differently, compared to their experience during the lesson, as

the teachers were now on the other side of the camera lens. This could be due to the participants noticing things that they might not have noticed during the lesson. Noticing these things could alter an individual's perspective on how they view things, or an event. The participants were then assumed to have reflected on this experience until their next lesson.

3.3.6 Second Cycle of Recording

The recording of a second lesson, selection of recorded scenes and video-stimulated interview based on those scenes were then repeated approximately two weeks later. The period of two weeks was chosen to accommodate the recording of a second lesson as well as allow time for the researcher to select and analyse recorded scenes. The reason that the interview cycle was repeated was also to compare the initial perspective of participants, and to observe if any development took place during the break between interviews, by the second cycle of interviews. It was assumed by the researcher that the second interview would have had a participant reflecting on a lesson with slightly more awareness of their teaching practices. The first interview would have introduced them to aspects that they have not noticed before. There was a possibility that the second interview would have had them speaking with newly found awareness in mind.

3.3.7 Transcription of interviews

The interviews were audio-recorded and these recordings were transcribed. Due to major parts of the transcriptions of School 2 being in Afrikaans, the researcher had to translate the transcriptions into English. These transcriptions formed a major part of the data that was used and analysed for this study.

3.4 Population and Sampling

According to Gentles, Charles, Ploeg and McKibbon (2015), sampling refers to the selection of specific data sources (participants) from which data is collected to address the research objectives. The population was the mathematics teams in all the Western Cape schools. I purposively selected two public schools in the Western Cape to work with. Out of the two schools I also purposively selected two teachers from each team, who volunteered to have their classroom lessons recorded and to participate in the interview process. Volunteers were chosen so that the teachers did not feel forced to cooperate for the sake of the study. The intention was that teachers felt that they were being supported in respect of a technique of

reflective practice, and not evaluated. Two volunteers from the mathematics team of each school represented the sample. I decided on using a sample of at least four teachers as I felt that this would provide sufficient data for the research study to be valid and reliable.

3.5 Data Analysis

The data was analysed through the method of thematic analysis. Tuckett (2005) described thematic analysis as comparing data that forms part of to a specific theme, in order to recognise or discover a common feature of that theme. Thematic analysis is also discussed by Clarke and Braun (2017) as a method of identifying and grouping themes and patterns in qualitative data. Humble and Mozelius (2022) further discuss thematic analysis by identifying two approaches, namely: inductive, and deductive. Morgan (2022) explains the two approaches as follows:

Inductive approach – This is when themes are identified and interpreted from the collected data. The researcher analyses the data to make sense of it and possibly identify themes which arise.

Deductive approach – This is when the researcher has a preconceived idea of the themes that may arise from the data, used in order to prove an idea.

This study used the inductive approach. This means that the data was analysed by being reviewed and by searching for themes which were noticeable, and then grouped into categories. The questionnaires (Appendix A) assisted in gaining an understanding of what the teachers' perspectives of reflection were, so that there was a baseline understanding of the perspectives that the teachers had when they approached the training. The video-stimulated interviews (Appendix B) assisted in gaining clarity of the teachers' perspectives of reflection through VSR, and to what extent the exposure to VSR affected their awareness of their own practices. The video-stimulus provided the possibility to assist the teachers in becoming more aware of their practices, after watching the recordings, and observing themselves as an outsider. As the themes were highlighted (by the teachers) in the first cycle of interviews, these were the specific aspects that the teachers appeared to have focused on to develop or improve, by their second cycle of recordings. This will be further elaborated on in chapter four, in a discussion on teachers' development.

3.6 Ethical considerations

Permission was applied for, to conduct the research study in the two identified public schools in the Western Cape. The permission was applied for at The University of the Western Cape (UWC), as well as the Western Cape Education Department (WCED). Permission was granted by both institutions to conduct the research. All participants in the study had their identity protected as none of their names or personal information were revealed or displayed in any of the content; names of the schools in question were also protected. Pseudonyms were used instead of names. Consent to be part of the research study (Appendices H and I) was asked of the teachers. Since video footage was recorded in the teachers' classrooms, assent from the learners in the respective classes were also sought, as well as consent from the learners' parents (Appendices E and F). To avoid any exposure of a learner's identity, images were blurred out to protect the individual's identity. All involved parties received detailed information on what the research study was about and its purpose, how it would be conducted, and any other relevant information, so that they were aware of details of the study. All the participants were given the freedom to opt out of the study at any time if they chose to do so, without any negative consequences. If there were any learners or parents who did not grant permission to be part of the video-recorded lesson, arrangements were made for those learners to be supervised during the recording. Teachers were assured that non-participation would not result in any negative consequences for them, and that the study was conducted as a means to collect data and not to critique their practices. This was reiterated as the intention of this study was to gain an understanding of teachers' perspectives and not to measure their performance. Reiteration was intended to create a calm, conducive environment for the teachers and so that they could focus on their reflective practice. The study also did not interfere with the running of the school.

All video-footage and audio-recordings captured was stored on secure, password protected devices and only the research team had access to these. The audio-recordings were transcribed and typed in Word-format, and these were also securely stored. Any hard copies of data that were collected (questionnaire and interview), were stored in a locked, personal safe which only the research team had access to. The context of the COVID-19 pandemic had been taken into consideration, and in the event that it was not possible for written data to be collected, data for the questionnaire and interview would have been captured digitally. The latter would also have been stored on these devices. Fortunately, there was no need for these

measures. All other Covid-19 regulations (as per the Department of Health) were adhered to, such as sanitizing of hands, wearing of face masks, and proper social distancing in order to maintain the safety of all individuals involved in the project.

It must also be noted that the researcher does not have any personal, economic or financial interests that are relevant to this study. This research study was conducted for fulfilment of a Masters of Education degree, and as a contribution to the field of Mathematics Education. The findings of the study will be shared with the relevant schools and participants after the study, by means of dissemination of a hard and/or a digital copy of the final thesis.

3.7 Summary of Research Design

The study used a qualitative research design, implementing aspects of Green (2006) centric reflection model, specifically the egocentric perspective. Data were collected from the pre-training questionnaire and interviews during the above-mentioned research process steps. The mention of training of the mathematics teams was to give context to the necessary skills needed for VSR. Each of the four volunteers met with the researcher and were interviewed (Appendix B). The aim of the interviews was to ask questions that attempted to probe the teachers' perspective of reflection, and to what extent the exposure to VSR affected their awareness of their own practices. These interviews were audio-recorded to capture the accuracy of the teachers' responses. The audio-recordings were then transcribed to be presented as part of the data collection. The intention of having individual interviews and not a group interview, was so that the teachers felt completely comfortable to speak about their perspectives, without feeling that they were being criticized by a colleague, as well as to gather authentic responses from each individual. This did not end up as planned at School 2 and interviews were conducted in a group. This, however, did not affect being able to produce data that addressed the research question. The data was then analysed through thematic methods, using an inductive approach.

In the following chapter, data analysis will be discussed.

Chapter 4 Data Analysis

4.1 Introduction

This chapter is a discussion of the analysed data that was collected for this research project. Data were collected using a questionnaire, video-recordings of lessons and video-stimulated semi-structured interviews thereafter. The aim of the questionnaires given to all teachers who were part of the mathematics team at each school, was to gauge the teachers' perspective of reflection. The video-recording of lessons were conducted in two teachers' classes from each school, and used so that the teachers could see their own conduct in their classrooms as well as all the other aspects for reflection on their teaching. The video-recordings were also used as a stimulus when each teacher was interviewed; the interviews were to gain a better understanding of the teachers' perspective of reflection. The interviews were audio-recorded and then transcribed. The data analysis aimed to answer the following research questions:

Main Question: How, and to what extent, does exposure to Video Stimulated Recall affect the mathematics teachers' perspective of reflection?

Sub-questions:

1 How, and to what extent, did the exposure of mathematics teachers to VSR, shift their perspective of their own practice?

2 How, and to what extent, did the mathematics teachers develop through their exposure to VSR as a reflective tool?

The data was analysed through the method of thematic analyses, which is discussed by Clarke and Braun (2017) as a method of identifying and grouping themes and patterns in qualitative data. This study used the inductive approach to analyse the data. Morgan (2022) explains the inductive approach as a method that identifies and interprets themes in the data that is collected. The questionnaires and interviews were used as data in this study. To reiterate, the data was analysed to find any themes and patterns that may have occurred, which would give the researcher an understanding of recurring themes. This means that the data was analysed by being reviewed and by detecting noticeable themes, which were

grouped were into categories. The questionnaires (Appendix A) assisted the researcher in gaining an understanding of what the teachers' perspectives were of reflection, so that there was a baseline understanding of the perspectives that the teachers had when they approached the training. The VSR interviews (Appendix B) assisted me in gaining clarity of the teachers' perspectives of reflection through VSR, and to what extent the exposure to VSR affected their awareness of their own practices. The video-stimulus also provided the possibility to allow teachers to compare their lessons and track their development. As certain themes were highlighted by participants in the first cycle of interviews, these were the specific aspects observed by the researcher that the teachers appeared to have focused on to develop or improve on, in their second cycle of recordings. To simplify the research questions, the data was sorted under three relevant headings pertaining to the research questions, which were View on Reflection, View on Practices, and Development through VSR and reflection. These categories were developed as it highlighted and organised the data needed to answer the research questions. To protect the identity of the schools, they were given the pseudonyms S1 and S2. The four participating teachers were given the pseudonyms T1, T2, T3 and T4; T1 and T2 were teachers at S1, and T3 and T4 taught at S2.

4.2 Analyses of data

This analysis included aspects of Green's (2006) centric reflection model. This model focuses on the different perspectives of reflection, and this analysis focused on the egocentric (view of self) perspective of reflection, which outlines how the individual views and understands themselves. Since the research questions relate to how the teachers view themselves, the egocentric perspective was the most relevant perspective in terms of gaining insight from the teachers' point-of-view. The data collected from the pre-training questionnaires and the video-stimulated interviews were discussed under the headings: View on Reflection, View on Practices, and Development through VSR and reflection. View on Reflection focused on the collected data that highlighted the teachers' perspectives of reflection, and any change in perspective throughout the study. These included excerpts of the pre-training questionnaires, as well as transcribed excerpts from the video-stimulated interviews, during which the teachers discussed how they reflected on the video recordings. View on Practices focused on the data which highlighted the teachers' awareness of their practice, and whether there were any developments. This included excerpts from the video-stimulated interviews in which the teachers spoke about their reflections on their practices

during lessons, and any areas that they had identified for development. The heading "Development through VSR" focused on the data which highlighted the teachers' development throughout the VSR study. The data was then analyzed to highlight the state of the teachers' developments through the study. These analyses are documented below under the relevant headings, preceded by a brief background on each school and teacher.

4.3 Background on S1

S1 is a school located in an affluent area and is a quintile 5 school. According to the National Norms and Standards for School funding (DoE, 2004), public schools are sorted into quintiles, focusing on the financial needs of the school. This means that quintile 5 schools are considered well-resourced and receive very little funding from the state. Quintile 1 schools are considered needy and in poverty-stricken areas, and schools in this quintile would receive the most funding from the state. Although the school is listed as a quintile 5 school, the majority of the learners come from poor socio-economic backgrounds and commuted from townships far from the school. The classroom spaces were limited, and especially more so under Covid-19 regulations at the time of data collection.

S1 is a public school and has to adhere to the national education department's instructions. During the Covid-19 period, all individuals in a public space had to physically distance themselves in efforts to curtail the spread of the Covid-19 virus. This meant that seating in the classrooms had to be spread out to create large physical spaces between learners. Grades R-5 attended school on a rotational basis, and Grades 6 and 7 were expected to attend daily. A handful of learners did not attend school at all for more than a month after schools had reopened, after the strict lockdown period. This resulted in many teachers not being able to focus on their teaching practice or development, as they were tasked with implementing and workshopping the curriculum changes influenced by the Covid-19 lockdown. The focus on the new curriculum changes appeared to direct teachers away from focusing on the development on their practice.

4.4 Background of S2

S2 is a disadvantaged school located in the Cape Flats and is a Quintile 1 school. It is a school-fees free school, and the school was well-equipped with technology, provided for by the WCED. The learners attended school on a rotational basis during the Covid-19 period,

and learner attendance during this period was quite poor, with a handful of learners also not attending after schools had reopened after the strict lockdown period. Therefore, the mathematics team was more focused on making sure that all learners were on track and their personal development was not focused on as much.

4.5 Biographical data of T1

T1 was a post-level 1 teacher with five years of teaching experience. She had been teaching at the grade 4 level for five years and had no formal mathematics education training. The average amount of learners in T1's class at the time of data collection was between 30-35 learners, but due to the rotational timetable the numbers were reduced to around 20 learners. This meant that the learners were split into groups and expected to attend school on alternate days.

4.6 Biographical data of T2

T2 had twenty-nine years of teaching experience. He had formal training in mathematics education. At the time of the data collection, he taught mathematics to grade 6 and 7 classes at S1, and also had experience in teaching Social Sciences and Natural Sciences. Data collection occurred only in T2's grade 7 class. The average amount of learners in his class at the time of data collection was between 30-35 learners. S1's decision was that grade 7 was a senior grade, therefore the rotational timetable and reduced class numbers were not implemented.

4.7 Biographical data of T3

T3 had ten years of teaching experience and had no formal training in mathematics education. At the time of the data collection, he taught mathematics to grade 5 learners at S2, and also had experience in Technology, Social Sciences, and Physical Education. S2 also implemented the rotational timetable and this reduced the average amount of learners in T3's class at the time of data collection to between 15-20 learners.

4.8 Biographical data of T4

T4 was a veteran teacher who had forty years of teaching experience. At the time of the data collection, she taught only a grade 4 class, and her teaching experience consisted mainly of teaching mathematics. The average amount of learners in T4's class at the time of data collection was between 15-20. This number was also based on a reduced amount, due to the rotational timetable.

Each of the teachers will now be discussed under the three headings mentioned earlier:

4.9 Teacher 1 (T1)

T1 taught a lesson on elapsed time (telling time) for the first cycle of lesson recordings, and the second cycle of recordings consisted of a lesson on 2D shapes. The lessons were taught for grade 4s. T1's interview was conducted with the only other person present being the researcher.

4.9.1 View on Reflection

This section focused on T1's view of reflection, and how exposure to VSR may have shifted her perspective of reflection. This included data which related to how T1 was reflecting on the video-recordings, and if any changes in her perspective were observed, due to exposure to VSR.

First cycle

According to Schratz (2006), teachers require insight of what needs to change within their context, for development to take place. This allows teachers to direct their own self-development processes, which is important to more appropriately suit their context. There are potential situations where an outsider would advise a teacher in which areas they would need development. For teacher development to be more effective, the teacher needs to be consciously aware (or made aware) of the area that s/he needs development in, and why. T1 was asked what her view on reflection was, to which she responded:

> *I don't think I have one. I think for me the reflection was just like okay so this worked, this didn't and I'm going to do it differently next year… Initially reflection was just based on planning. And then changing the planning (Interview with T1, First cycle).*

This could be an example of T1 being unconscious of incompetence in terms of his reflection. T1 was not aware of what reflection entailed in order for development to take place. Since T1 appeared to not be aware (unconscious) of how to reflect, this resulted in the incompetence aspect hindering any development, in terms of reflection, from taking place. It appeared as if T1 was practicing within her comfort zone and did not feel the need to seek further development of her reflection practice. The reflection-on-action type of reflection that T1 had been practicing was solely based on lesson planning, which was being planned by another teacher. This is an example of macro-centric perspective reflection which focuses on the content and standards of lessons, and does not focus on the 'self', which the egocentric perspective focuses on. The issue with this perspective of reflection is that T1 was not consciously reflecting on her own actions within the context, and how that could affect her lessons.

It was after viewing the video-recorded footage that T1 realised that reflection goes further than the macro-centric perspective and noticed incompetence that could be addressed in her lessons. Aspects of 'noticing' is explained by Van Es and Sherin (2002) as being able to make connections between the interactions of teachers and learners during lessons, and the broader principles of the lessons, such as the lesson planning. This also includes using your knowledge of the context (classroom) to explain various events that took place during lessons. According to Mathew, Mathew and Peechattu (2017), reflective teaching allows teachers to analyse their practices, and reflect on how it may be improved or changed, to achieve better learning outcomes. The process of reflection through VSR allows the teacher to reflect on her classroom practice, analyse and identify her conduct, and this could lead T1 to improving the effectiveness of her classroom practice. This reflection-on-action type of reflection could give T1 the opportunity to make the necessary changes that she perceives as appropriate in her classroom. Theres a possibility that T1 could've noticed contextual factors affecting her lesson which would not change or develop by adapting the lesson planning.

The usage of VSR assisted T1 in noticing an error which she would not have noticed previously without a video recording. VSR provides teachers with the ability to relive the lesson as an outsider, noticing any errors or gaps in their lessons. In the scene quoted above, T1 was giving a mathematics lesson on the topic of Time. She had a picture of an analogue clock on the board and mistakenly mentioned the wrong time. T1 did not realize that she had made a mistake and continued with her lesson. It was through watching the video-recording of her lesson that not only did she realize that she had made an error, but that without the

stimulus of the video-recording, she would not have known that she had made an error and not correct herself:

> *Do I fix it? No, I don't. I said twenty to nine but it's twenty to ten [raises hand to cover mouth and smiles with embarrassment]. So the time is right but my words are wrong (Interview with T1, First cycle).*

T1's body language displayed surprise and an element of shame upon noticing her error as she was not aware of this error during her lesson. Although she was embarrassed by this error, she realized the usefulness of VSR as a tool in the classroom and why her initial understanding and practice of reflection was not effective.

T1 also commented on how VSR assisted her in noticing and making connections in her context, as to why her lessons are not going as planned. She mentioned that she did not understand where the disconnect was and how she could overcome it. She said the following:

> *I need some feedback; I'm not understanding why they are not getting it or what I'm doing wrong. Sometimes you ask "what am I doing wrong, the kids are just not getting it" and that (VSR) could help (Interview with T1, First cycle).*

After viewing the video-recorded lesson, it became clear to her, and she realized that VSR provided concrete, personal feedback on how and where she could develop as a teacher. This echoes what Van Es and Sherin (2002) proposes regarding noticing in the classroom and how a teacher can use their knowledge of what is happening in the classroom (contextual factors), to comprehend why certain events took place as well as identify which events need improvement. T1 was not sure where she was going wrong with her lessons, but by using VSR she started noticing exactly why her lessons (and learners' understanding) yielded specific results. The feedback which she had received was from herself as she viewed the footage from the other side of the video lens. Being able to view the footage from that side allowed her to notice which areas of her lesson needed development, as she was now replaying the lesson and observing it with 'different eyes'. Philipp et al (2007) states that observing video-recorded lessons are more effective than live observations as the teacher would be able to focus their attention more on how well the learners are grasping and reacting to the content and be less focused on the technical aspects of the lesson, such as lesson planning. It is especially important in teaching mathematics that the correct knowledge is imparted by the teacher, in order for the learners to fully grasp a concept and be able to apply the concept successfully in different problem-solving situations.

Another aspect was noticed by the teacher in the video episode:

> *The concern is that if I say twenty to nine and I put the hands on the wrong time, or the right time and say the wrong time, then they're going to now think that that is right… I'm basically confirming their wrong way of thinking (Interview with T1, First cycle).*

This is an example of T1 making a connection between a specific interaction and broader principles of teaching. This is the same lesson that T1 was conducting on the topic of Time. She was using an analogue clock to represent a specific time, but unknowingly stated the wrong time. She realized that she was teaching her learners the wrong thing, and that they (the learners) would not be aware that it was wrong. The realizations described here can be interpreted as T1's reflection developing, which we noticed in the context of her becoming aware of how her initial practice of reflection was not effective within her context. We also noticed T1 shifting out of a comfort zone and towards the zone of insecurity (second stage). This can be noticed in how T1 begins observing her practice more critically. It is also clear how T1's perspective of reflection shifted from the macro-centric towards the egocentric. Initially T1 was under the impression that the reflection of her lessons stemmed from the lesson planning, but during the first interview it is evident that her perspective of reflection shifted to the egocentric and which aspects of her own teaching she could change in order to develop. As T1 noticed the different aspects of her teaching which needed development she added, *"I would definitely adapt the way I prepare the lessons."* (Interview with T1, First cycle).

This could be seen as moving from the unconscious incompetence towards becoming consciously incompetent in terms of reflection, as T1 realised the areas of her practice that needed development. T1 became aware of how to reflect and how to better reflect on her practice to improve her conduct and the learners' experiences. Schratz (2003) elaborates on unconscious incompetence further by connecting it to comfort. T1 was initially comfortable with repeating the steps of planning each year and basically depended on the lesson planning to ensure the success of the lesson. As T1's understanding of reflection developed, she became consciously aware of her teaching and where she needed development. This Schratz (2003) explains as moving towards being consciously competent, resulting in confidence in T1, as she is now aware of what to do in future and how to use reflection to develop her lessons. The development and shift towards being consciously incompetent was caused by T1 noticing "…those small things that you don't necessarily see..." (Interview with T1, 16 September 2021), which Sherin and Star (2011) explains as identifying what is important

about your classroom context. T1 could be seen as viewing the video-recorded footage with a different perspective and noticing which areas of her own teaching and context was in need of development. The ability of having teachers explore other views of reflection, as well as reflect on their own practices, could assist teachers to improving what happens in their classrooms

4.9.2 Second cycle

The second video-recorded lesson was on 2D shapes for a grade 4 class, and the researcher noticed some interesting development. Schratz (2006) mentions that although there is potential for development, teachers need to actually step out of their comfort zones and act differently in order for any change and development to occur. T1 admitted having reflected on the previous lesson and interview. T1 stepped out of her comfort zone in admitting that she identified certain features of her previous reflective practice that she would change. She mentioned the following:

> *I think that because we don't necessarily reflect at all, sometimes or only during the lesson ... With this you can identify things and then plan better (Interview with T1, Second cycle).*

The fact that T1 admitted that she did not reflect that much previously (apart from reviewing the lesson planning), shows the shift of awareness of reflection. This could be seen as T1 shifting out of the comfort zone and towards the state of insecurity, as her awareness of her practice appeared to be developing, moving from the unconsciously incompetent to the consciously incompetent. T1 intended on using this reflection as part of planning her lessons. T1 realized that her initial view of reflection was based on a macro-centric perspective, focusing on theory and policy. This is evident in the excerpt below:

> *For me, continuous professional development was mostly based on curriculum and how to assess...it was very theoretical in my view. It's (VSR) more centered around myself and what I'm doing wrong and how I can fix it…The feedback is instant ... you can easily just make changes for the next lesson or the next term or the next year and then know exactly what it is you do wrong (Interview with T1, Second cycle).*

T1 realized that reflection should include the egocentric perspective as this would impact on the context within which she taught, which directly impacted her. Once T1 identified what she was doing wrong, or what she could change in her lessons, only then could she amends her lesson planning. T1's development had shifted from the unconscious incompetent, where T1 appeared not to be aware or interested in reflecting, to the consciously incompetent, where

T1 was in a state where development was beginning to take place. T1 was becoming aware of how VSR could assist her in identifying areas of her practice which could need development.

4.9.3 View on Practices

This section focused on T1's view on her practices, and how exposure to VSR may have shifted her perspective on her practices. This included data which related to T1 discussing her teaching practices, and if any changes in her practice and perspective were observed.

First cycle

As a teacher's understanding of reflection develops, the effectiveness of the reflection becomes evident when this new understanding s put into practice. Schratz (2003) explains that being consciously incompetent puts the teacher in a state of insecurity, as they are in a state of development where they notice and become aware of areas of their practice which may need development. An example of this is a teacher who is aware of the errors that they make but have not corrected their practices. This teacher would not be very secure with their teaching, and this insecurity could be seen as propelling the teacher to develop their practice. An example of this is when T1 noticed that she had spent a lot of time at the beginning of her lesson on enhancing prior knowledge, that she possibly over-prepared or incorrectly prepared for her lesson. This resulted in her running out of time before she could cover what she had planned:

> *While I was teaching I was realizing these kids actually don't get it or they didn't get it and that is also why this lesson took a little longer… I had to spend a lot of time on the beginning knowledge before I could actually get to what I wanted to teach, which was 'elapsed time' (Interview with T1, First cycle).*

Here we become aware of how T1 shifts from the unconscious incompetence state towards the consciously incompetent state of development as she realized where her lesson could have been improved. This conscious incompetence is evident in the following quote:

> *…you can easily pick up on what works and what doesn't work…sometimes you don't know if they get it or if they didn't…I don't know if I should do that much revision in a new lesson (Interview with T1, First cycle).*

This is an interesting scene as T1 shifted from the unconscious incompetence to the conscious incompetence stage of reflection. The "I don't know" might display T1's insecurity which

according to Schratz (2006) links to conscious incompetence. T1's comment that she did not know if her method of revision was appropriate or not, showed that she was aware of an area that she needed development in. This could be labeled as insecurity (Schratz, 2006) as T1 became more aware of her practice and how it could be amended. The shift from unconscious incompetence moving towards conscious incompetence happened when T1 realized what she would change in future lessons. The type of reflection that T1 was displaying can be explained in terms of Green's (2006) centric model of reflection as being 'reflection-on-action". This is explained as the teacher reflecting on the lesson that has already been delivered (reflecting on the action that had passed) and reflecting on the effectiveness of the lesson or identifying a need/area that needs development. Smith (2015) states that it is important for a teacher to be aware of which areas need improvement in order for their practice to improve. This is displayed in T1's lessons, when she became aware of the areas which needed improvement, and she actively made an attempt at improving in those areas during the second video-recorded lesson.

4.9.4 Second cycle

T1's second lesson was on 2D shapes for a grade four class. The researcher observed that the learners appeared more settled, compared to the first lesson recording session. Philipp et al. (2007) and Geiger, Muir and Lamb (2016) stated that videos can assist teachers in becoming aware of student learning and evidence thereof, and how to provide learners with what they need, more efficiently. In the first lesson, the learners in T1's class were observed as being restless and inattentive. There were learners not paying attention and this only came to T1's attention after watching the video-recording, and not while she was teaching.

> *Yeah, I think I started a bit haphazardly the last time where I just said okay, today we're going to do and nobody was already paying attention to me (Interview with T1, Second cycle).*

She was also conscious that this was a reflection of how she was conducting her lessons. T1 was aware that the learners were not paying attention to her during the first cycle, but she had carried on with the lesson anyway. It appeared as if T1 reflected on the above-mentioned detail after the first cycle, and it could be seen as T1 then stepped out of the insecurity zone (consciously incompetent; aware that she was doing something wrong) and attempted to change the way her lessons began, in order for the learners' behavior to change, shifting into the confidence state (consciously competent) and by the second cycle she had attempted to address this issue. The reflection allowed T1 to change how she positioned herself in the

classroom in the second cycle, as well as to incorporate techniques to increase the learners' attentiveness at the beginning of the second lesson. As T1 moved forward, this confidence allowed her to be more aware and in control of her lessons compared to previously. She mentioned the following:

> *You'll see I'm walking forward as oppose to standing in front because otherwise I miss the ones at the back. I decide who I am going to use for that question, who is going to take the lesson forward, and if it's also like one that I think might struggle for that question, then I can elaborate. But also just giving everybody a fair chance (Interview with T1, Second cycle).*

T1 was explaining how she had carefully thought through how she would conduct the lesson. Her focus was on how she conducted the lesson, and not how the learners were perceiving the lesson. This could be seen as an example of egocentric reflection as T1 was reflecting on how she conducted the lesson. This is a shift from the consciously incompetent (insecurity zone), towards the consciously competent (confident zone). In the consciously incompetent state of development, T1 was aware of areas in her practice which needed development, such as learner-behaviour management. As T1 implemented the development needed in the identified areas, we could observe this as T1 shifting into the consciously competent state as she was aware of what she needed to do and acted on it. This was a significant development that took place in terms of the teacher's development.

T1 also noted that being able to reflect using VSR allowed her instant feedback, and she was then able to almost immediately amend her practices in order to teach more effectively.

> *When we attended that workshops (department arranged CPD workshops), it's just like information overload and none of it could be put into practice … it required a lot of planning …This is like more instant like I watched the video and the next lesson I changed what I did (Interview with T1, Second cycle).*

T1 was commenting above on how the workshops that were available for teachers did not really focus on the context of the teachers. There was much of information provided but a great deal of the information could not be applied to certain contexts or wasn't relevant. It still required much input from the teacher, to tailor this information to adapt it successfully in their own classrooms. With VSR, teachers are able to identify aspects in their own practices that they notice need improvement and are able to apply it immediately. This could be seen as

the previous workshops not having encouraged T1 to shift out of the previous unconscious incompetent state, possibly explaining why T1 appeared to be in a comfort zone at the beginning of the study. T1 then went on to discuss how VSR allowed her to reflect on her practices and what needed to be changed in order to improve the learning in her classroom. It was evident that T1 had previously only used the projector/whiteboard during the first cycle but had incorporated the use of the chalkboard as well in the second cycle. When probed about this, T1 explained that she displayed various 2D shapes on the whiteboard via the projector. She became aware of the fact that verbally questioning her learners during lessons needed to be supported by letting the learners record it in their books. She would have had to remove the picture from the whiteboard in order to display the written answer for the learners, and she felt that she wanted to keep the 2D shape on display while the learners wrote the answers down in their books. This made T1 decide to incorporate the use of the chalkboard to write the answers on for learners to copy down into their books, allowing her to keep the various 2D shapes on display on the whiteboard. The learners therefore wrote down the correct answers in their books:

> *The diagram was on the whiteboard and then they (the learners) needed to identify the shapes (of the displayed 2D shapes). So they would've just done it verbally, but I wanted to write it down so they could see the name and spelling and then also record it in their books 'cause they have the same copy in their books. And then have a copy of the answers for themselves and as opposed to just saying it out verbally. I (then) wrote it down for them (Interview with T1, Second cycle).*

Here T1 was able to identify what would assist her learners in understanding the section better and was able to ensure that they copy down (and make connections between) the correct answers. Through analyzing the video-recording of her lesson, she became aware that in her previous lesson she had simply done an exercise verbally with the learners. She realized that with all the restlessness in the class during the lesson, there were probably many learners who would not have heard the answers to certain questions, which is why she asked learners to write their answers down. This could also be regarded as signs of T1 shifting from the consciously incompetent, to the consciously competent state of development, as she implemented changes which she deemed is necessary and attempted to change how she taught in order to enhance learning in her class.

It's not somebody else's objective of the way teaching should be and it's more subjective for me to adapt what I'm doing because I don't necessarily agree with someone telling me this is a way you should teach maths when there is so many other options that's suited to me and my classroom (Interview with T1, Second cycle).

Here it could be seen as T1 understanding that she has got the skills and ability to reflect on her own practice, and that she does not necessarily need an 'outsider' to show her how to improve on her reflective practice. VSR allowed her to be able to identify what needs to be changed in her teaching in order to reach the specific group of learners that she is teaching. It can be perceived that she felt a sense of empowerment through VSR. This put her at the driving seat of her own development.

4.9.5 Development through VSR and Reflection

According to Sherin and Star (2011), teachers may physically recognise events in their context, but only some may be recognised consciously, resulting in the teacher 'noticing' and being aware of an event. During the first interview T1 noticed that one of the learners was not in his seat and not paying attention while she was teaching. When asked if she was aware of this behaviour while teaching, she said that she was not:

When you're focusing on other things or when your back is turned and then you don't notice what's happening in the other half of the class… (Interview with T1, First cycle).

Although T1 was generally aware of all of her learners in the classroom, she admitted that there were times when a teacher's attention was not on the entire class. T1 gained a lot of insight from the video-recording of the lesson, in relation to how her learners were reacting and behaving during lessons when she was distracted. The video-recording stimulus allowed her to see things which she could not normally see, and once again T1 was observed to have moved from the unconscious incompetent towards the consciously incompetent.

While watching the above scene, T1 was observed reflecting, using the reflect-for-action approach, as she was already thinking of how she could improve and develop in that area.

I'm wondering now like what position should I stand in …Like what would be the right place to stand in a class of thirty-five to be able to make sure that no one is doing whatever, but at the same time you need to move around (Interview with T1, First cycle).

The above extract was from the first interview, and already it could be observed how T1 had developed in terms of how she reflected. As she viewed the scene, it was evident how she was already attempting to figure out how to improve on what she had noticed. Although T1's understanding of reflection was initially from a macro-centric perspective, it was shifted to an egocentric perspective by the questions that T1 was asked in the interview, as well as the fact that she seemingly naturally observed her own actions and reactions in the video-recorded lessons. As soon as T1 noticed the learner's behaviour, the researcher could observe (by her body language) her trying to figure out how to improve on her physical positioning in the classroom. in order to prevent such occurrences from happening again during her lessons.

There was a similar incident where T1 asked her class a question based on the work, and all the learners were shouting out answers at once.

It's like everyone is answering at the same time and I'm not having control, it was just like shouting out answers …But there is no way to tell who are the ones that know and don't know…everyone is shouting out and it's easy to just carry on but… … sometimes they just all shout answers but they're excited to just shout out answers and then I don't say okay put up your hand, I just kind of go with it. But I don't know if that is a good or a bad thing (Interview with T1, First cycle).

Once again one may observe T1 moving from the unconsciously incompetent towards the consciously incompetent and admitting that she did not know what to do in this situation. She definitely noticed that allowing the learners to shout out answers, was not the appropriate thing to do. However, she commented that she allowed it to happen in the heat of the moment, but upon seeing the video-recorded lesson from a different perspective, she admitted that the class was out of control. When the second interview was conducted, it could be observed that T1 was now reflecting from a more egocentric perspective and was aware that reflection of lessons was more than simply based on the lesson planning. The second interview had a seemingly more confident T1:

I think it's the delivery of the lesson like the methods that I used and also … over planning and being over prepared …it assisted me with that like you know, like the way I deliver the lesson and

then the topics that I choose and how I am going to deliver them? I think I tried to cram too much in the last time, … also just my own self-awareness of how I conduct myself in the class, the walking around, not using the ruler (Interview with T1, Second cycle).

T1 also commented, post-interview, that the reflection using the video-recorded lesson, was an "eye-opening experience", and that "nobody will see T1 again". This could be seen as T1 feeling more confident in her teaching and how she reflects, as well as being more conscious of her teaching. It could be interpreted that T1 had not been aware of how her lessons could be improved previously, if at all. Now it is observed that T1 is aware of what needed improvement in her teaching and reflection and became empowered to improve on her own teaching and reflective practice. According to Mann et al. (2009), most models of reflection incorporate the reflection on experience (the lesson that was taught) and practice (general manner of teaching) in order to be able to identify where the need is for learning to take place effectively. T1 became aware of that and it can be said that T1 is more competent in terms of noticing aspects that could be improved upon, through reflecting-on-action. It is important for reflection-on-action to take place as it would assist T1 in noticing what she is currently doing, in order for her to know where she can improve or change. T1 needs to be aware of the results of her actions in order to know if that specific practice is working in her lessons.

During the course of the two cycles, it was noticed that T1 had initially approached the study in an unconscious incompetence state of development, as she appeared not be aware of which areas of her practice needed development. As T1 became exposed to VSR as a tool for reflection, it was evident that T1 was beginning to shift out of the unconscious incompetent state of development and moving out of her comfort zone towards a state of conscious incompetence. It was observed during the second cycle that T1 had not remained in the conscious incompetent state but was shifting into the consciously competent state of development, as she proved to implement the development which she had identified in her classroom and practices. T1's perspective of reflecting initially appeared to be from a macro-centric perspective. It could be seen as exposure to VSR as a reflective tool that influenced T1 to reflect through the egocentric perspective, as she appeared more focused on herself and her practices.

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4.10 Teacher 2 (T2)

T2 taught a lesson on constructing and measuring angles (geometry) for the first cycle of lesson recordings, and the second cycle of recordings consisted of a lesson on 3D objects. The lessons were taught for grade 7s. The first lesson consisted of T2 conducting a lesson on the construction and measurement of angles, with the use of a protractor. The second lesson was on 3D objects, which consisted of T2 classifying various 3D objects with the use of visual aids. T2's interview was conducted with just himself and the researcher present.

4.10.1 View on Reflection

This section is focused on T2's view of reflection, and how exposure to VSR may have shifted his perspective of reflection. This will include data which related to how T2 was reflecting on the video-recordings, and if any changes in his perspective were observed due to exposure to VSR.

First cycle

In T2's video-stimulated interview, he responded to what his view on reflection was. It appeared from the interview in the first cycle that T2's understanding was that reflection assists you in identifying problem areas in your teaching, and continuously improving on and adjusting these problem areas.

> *The more you expose yourself… you can see where your shortcomings are and you can work on all your shortcomings and by doing so… you are bound to improve wherever you see there needs to be adjustments made (Interview with T2, First cycle).*

T2 displayed an understanding of reflection being a practice that assists you in improving your teaching or lessons. The vague response of T2 could indicate that T2 is reflecting on what Schratz (2006) would interpret as a state of insecurity, or conscious incompetence. This could be interpreted as conscious incompetence, as T2 was aware of reflection, but appeared as if he was not making any attempt to develop his practices. T2 understood that reflection could be used to identify areas of a practice which may need development but did not make the shift into the state of conscious competence by implementing the identified changes needed. T2 appeared as if his understanding of the lesson recording was for evaluative purposes. He was further asked if there were any specific reflective practices which he used, and he responded with the following:

I was taught by the advisors… whenever you do a maths lesson you've got to put the source, you know where it is taken from… in all my work …I will always, you know, indicate where I took it from (Interview with T2, First cycle).

This is another example of a teacher displaying a macro-centric perspective of reflection as well as reflection-for-action, focusing on the lesson plans and standards of the lesson and not how this would affect the learners. Not only was T2 not reflecting within his own context, but following advice that was taught to him several years ago. The issue is not following advice, but rather sticking to it for many years and not developing it. Another example of T2 reflecting in a misdirected manner could be seen in the following excerpt. T2 stated that VSR was an effective tool for reflection but his reasons should be noted:

More effective, yes definitely… because … number one you know you're being watched… you try so much harder… not to make any you know, errors etc. … you're gonna be more on your toes. you never actually heard how you sound (Interview with T2, First cycle).

It could be noticed that T2 is seeing this activity as a form of evaluation. His focus seemed to be on errors that he might be making in his lessons, and that he should be improving 'for the camera'. This type of perspective could lead to a manner of reflection-for-action. Instead of observing the lesson and trying to identify how he could improve, it appeared as if T2 taught this lesson with a mindset where he 'should not make mistakes' or where he is "performing for the camera". It could be argued that T2 was conditioned by previous experiences of school advisors conducting lesson observations in a manner of identifying teacher errors and advising the teacher about the relevant parts of their lesson that had to be changed, even though they were not familiar with the context of the class. VSR, as a reflective tool, could allow the teacher to be able to reflect on their own lessons and contexts without the pressure of feeling like they were being evaluated. It appears as if T2's limited understanding of reflection was preventing him from moving out of the consciously incompetent state of development.

4.10.2. Second cycle

In the second interview, T2 was asked if his idea of reflection had changed in any way since his first lesson and interview, to which he responded:

I became more aware of myself as a teacher actually, whereas before you know, I wasn't so much aware of what I was doing, you know? (Interview with T2, Second cycle)

It could be seen that T2 was reflecting in the egocentric perspective, as he was now aware of his own actions. This could be seen as T2 remaining in the conscious incompetent state of development, as there did not appear to be any intention to identify any areas of his practice that needed development. Although T2 appeared to be reflecting using the reflect-on-action type of reflection, there did not appear to be any shift towards the conscious competence state, as T2 did not show any evidence of acting on his reflections. It appeared, however, as if T2 became more aware of and focused on his own teaching practice, and not only the lesson planning and theoretical aspects of the lesson. It also appeared as if T2 was beginning to reflect through the egocentric perspective, as he was becoming more focused on his own conduct and practice. When asked by the researcher if his view of reflection has changed since the previous interview, T2 responded with:

> *I won't say I had to be more aware of myself but I tried to lessen, maybe the errors …if I compare it to the last time? (Interview with T2, Second cycle)*

This could be interpreted as T2 still reflecting in a reflection-for-action manner, and as if he was being evaluated. T2 was referring to his teaching practice when he mentioned lessening errors. The focus on "errors" could be seen that T2 was intent on having a lesson with zero errors with regard to his teaching, and not too focused on the amount of learning taking place. Also, no reference was made of his learners, what they learnt and how they interacted with him and the lesson. Although he was reflecting through the egocentric perspective by being more aware of himself and his teaching, T2's motivation for reflection appeared to be driven by having a lesson with no errors, and not driven by a desire to develop his teaching practices. T2 further elaborated on whether his view of reflection had changed since the first cycle:

> *It definitely changed. You are more wary of yourself... with that comes high expectations … for you as a teacher from your learners (Interview with T2, Second cycle).*

This could be seen as T2 reflecting-for-action as well as reflect-in-action. He mentioned "expectations" and it appeared as if he still perceived that this activity's purpose was to observe him for evaluative purposes, and not as a means to identify areas where he (himself) could develop in. This could be seen as T2 being in the conscious incompetent state of development as he appeared to be aware that his practice might need improvement (the use of the word "wary" could indicate a sense of insecurity), but he did not act on it or implement any changes to influence development. Although the question of the study focused on

reflection-on-action, T2 appeared mainly to be reflecting-for and -in action. This means that T2 reflected in the sense of preparing for an event (lesson) with expectations of the outcome (reflect-for-action), and of being aware of himself as if he was being watched while teaching (reflect-in-action). There appeared to be very little awareness shown by T2 in regarding to his reflection on the selected recorded scenes. T2 watched the episodes, but it appeared as if he was not watching it intensely to identify areas where he could develop (reflect-on-action), but rather, trying to see how many errors he made, and could avoid in future.

In the excerpt he also spoke in the third person, using the words "you are more aware of yourself" and "you as a teacher …" and not "I am more aware of myself" and "as a teacher …". It is therefore questionable that he put himself at the centre when he analyzed the video or whether he was generalizing. This therefore also alludes to whether he is prepared to be open to learn in the process, and, if not, therefore his growth as a professional could be hindered due to his attitude. This could also be an indication of T2 remaining in the conscious incompetent state of development.

4.10.3 T2 - View on Practices

This section focused on T2's view on his practices, and how exposure to VSR may have shifted his perspective in this regard. This included data which related to T2's discussion of his teaching practices, and if any changes in his practice and perspective were observed.

First cycle

T2 taught a grade 7 lesson on constructing and measuring angles. The lesson commenced with T2 giving a short test to gauge the learners' prior knowledge. T2 then commenced with writing a note on the chalk-board, which included the different terminology related to constructing and measuring angles, that the learners were expected to record in their books and learn independently. The entire lesson consisted of T2 alternating between writing the notes on the chalk-board, and 'lecturing' the learners. T2 implemented the use of a teaching aid in the form of a large mathematical-set protractor. This was used so that all learners could see clearly when T2 demonstrated how to measure angles, using a protractor. The researcher observed that many learners in the class did not have their own mathematical measurement sets, and this could be due to the learners not being able to afford their own stationery. In the following excerpt, T2 discussed why he had used the large protractor to

demonstrate how to measure angles using a protractor, to the learners. T2 further showed an allocentric perspective (view of the learner) of reflection:

> *Knowing about the inner scale and knowing about the outer scale. And that is the reason why, why I do a comparison between the protractor in their mathematical set and my protractors …Because what I noticed here is they'll always ask me, Sir must it be on one, then I say no. You start at zero (Interview with T2, First cycle).*

The above statement could be interpreted as T2 having a macro-centric and allocentric reflective perspective. T2 focused on the technical theoretical details (macro-centric) of the lesson, and how the learners understood it (allocentric). T2 did not display an egocentric perspective of reflection here, as he was aware of a common existing misunderstanding that learners display but did not focus on how his own teaching practice might repeat this misunderstanding of the learners. Instead, he simply corrected them. It could also be seen as reflection-for-action, as it appears as if T2 regularly encountered this misconception, and his solution is to simply correct the learners. An egocentric perspective would have T2 questioning his own practice, and how it could be contributing to the learners' misunderstanding of how to use a protractor. A reflection-on-action perspective would engage T2 in reflecting on how he had been teaching the learners about a protractor and how it is used, and what might be causing the learners to develop the common misunderstanding. Once T2 reflected on his teaching the learners in a reflection-on-action manner, he would be able to identify where the learners misunderstood how to use a protractor. This could also be an indication that T2 was still in the conscious incompetent state of development, as he did not make an attempt to develop his own practice, even though he was aware of a common misunderstanding that appeared regularly in his classes. Although it could be seen that T2 was not reflecting ideally in the egocentric manner, it was noted that the reflection process did result in T2 reflecting effectively in the egocentric manner:

> *Somewhere at home I've a full protractor. It is 360 degrees … I should have brought that to school. … You know afterwards I realised yor but I could've brought that one here which is a full protractor (Interview with T2, First cycle).*

Here T2 may be observed to be reflecting-on-action of the first lesson, and reflecting on how, as the class teacher, he could have improved on the lesson. This is a clear example of the effective feedback an individual could receive through VSR reflection. It was through watching this scene that T2 realised that a protractor showing more detail (a full revolution, circle) would have been more effective in making that specific lesson a success. T2 believed

that a 360° protractor would have been more effective in getting the learners to understand how angles are constructed, and how it links to a circle (360° angle). Had this been part of T2 lesson planning, he would have included the demonstration of the detailed protractor. It was not clear what made T2 believe this, as the learners were not given an opportunity to engage with him throughout the duration of the lesson, apart from the odd learner shouting out comments or questions.

Instead, it appears as if T2 has been focusing too much on the macro-centric perspective and sticking too closely to the lesson planning, neglecting the changing context of the class. It could be said that T2 was reflecting in a conscious incompetent manner, and the above example could be interpreted as T2 remaining in the conscious incompetent state of development as he identified an area of his lesson/practice which needed development but made no attempt to implement the changes. Although the above excerpt could be seen as T2 reflecting through the egocentric perspective, as he was identifying an aspect of his own practice, which could be enhanced, he was still observed as reverting back to the allocentric perspective, and this could be seen as hindering him from shifting out of the state of conscious incompetence. This is observed in the next excerpt:

> *What I've noticed when comes to measuring on the ruler... There are some learners here that don't know how to measure on a ruler. They will always start at one and not on zero. Why, I don't know (Interview with T2, First cycle).*

T2 was referring to learners not reading correctly, using a ruler when doing measurements. According to T2, learners start their readings at one and not at zero on the ruler and that this is a common type of misconception observed at S1. A possible reason to why T2 always encountered this type of misconception is because he had not implemented any changes in his teaching practice in order to influence any change in perspective. T2 was observed to not shift out of the conscious incompetent state of development. Although T2 admitted that he noticed this type of misconception, he did not reflect on how he was teaching the concept which could prevent this misconception from continuing. Instead, he accepted that he did not know why the learners did it. This is what led the researcher to interpret T2 as reflecting through the allocentric perspective. Reflecting using the egocentric perspective could have led to T2 questioning his actions (in class), or what he could do to enhance the learners' understanding. T2was aware of the issue but did not critically reflect on it.

Even though it could be argued that T2 should not be responsible for grade 7 learners' misunderstanding of how a ruler is used for measurement, it could also be argued that a teacher needs to ensure that effective learning takes place in class, even if this means reviewing the learners' prior knowledge and understanding of the concepts. Sometimes teachers reflect purely on the macro-centric manner and feel pressured to get through the lessons due to time constraints. This could result in learners' misunderstanding or repeating a misunderstanding without being corrected. The teacher should be focused on correcting the concept of measurement, in this example, and not in correcting the error that the learner made. T2 could practice reflection-on-action in this case, and by reflecting through the egocentric perspective, could address this misconception by attempting to become aware of what caused the misconception. At the time of the interview, it could be seen that T2 was consciously incompetent with regards to reflection in this scene, as he was aware that there was a misconception, but made no attempt to address it in terms of changing his own practice. It appeared as if T2 avoided reflecting through the egocentric perspective as he was observed to repeatedly reflect through the macro-centric and allocentric perspective. The researcher attempted to probe T2's view regarding 'lecturing' the learners and what he might have noticed by observing himself doing this from a different perspective (watching a recording of himself). T2 appeared to not attempt to reflect on this and responded, unrelated to the issues at hand, with the following excerpt:

> *There are times that I use about maybe four different textbooks. And that is the reason why I will always indicate (the source). You know as a matter of fact you know we're all supposed to do that (Interview with T2, First cycle).*

This is another example of T2 reflecting further on the macro-centric level, focusing on the planning and preparation aspect of the lesson. In the above comment, T2 was interpreting his idea of reflection as stating the sources of all the exercises that he provided the learners with and commenting that all teachers should be doing this as part of their practice. This could be an indication of T2 having no interest in developing his practices as he made no attempt to critically reflect on it. Instead, T2 appears to be focused on teachers in general, in his responses. This is further evidence of T2 not reflecting through the egocentric perspective as he did not reflect on himself. It could also be interpreted as T2 being in a state of unconscious incompetence, as he made no attempt to identify any areas within his own practices, which may need development. It could also be seen as another way in which T2's reflection was based on what he had been taught/trained to do, focusing on a macro-centric

perspective and reflecting-for-action. The egocentric perspective would have T2 reflecting on a lesson from his own context/classroom, in a reflect-on-action manner, and trying to identify which areas he could improve on in his own practices or interpreting the scene from a new perspective. When we refer to a new perspective, it is meant in the sense of T2 watching the scene with 'new eyes' and possibly noticing things that he did not notice before, through introspection. These things that he could potentially notice, could result in him understanding where learners' specific misconceptions came from, and potentially prevent the misunderstanding from repeating itself.

Another issue observed was learner conduct and T2's management of his learners' behaviour. It was observed by the researcher that there were a few learners in the recorded episode, that were out of their seats and not being attentive to the lesson while T2 was teaching. When the researcher asked T2 if he was aware of the inattentiveness and restlessness of the learners, he simply responded by saying that he was aware of it, as if that type of learner conduct was an acceptable occurrence in his class. Either T2 was in an unconscious incompetent state regarding observing this, or he did not find it to be an important aspect to pay attention to. His response was:

> *No, they shouldn't, they shouldn't have been there, they shouldn't have been there.*
>
> *Yes, I was aware they were there, I was (aware) they were there (Interview with T2, First cycle).*

The researcher attempted to probe T2 to elaborate more on why he had allowed the above to take place, but he showed no attempt to reason or justify the event. This led the researcher to interpret the scene as T2 in a state of conscious incompetence, as he was aware of the issue but made no attempt to critically reflect on it or implement changes to his practice, to avoid such occurrences from repeating itself in his class.

4.10.4 Second Cycle

The second cycle of recordings took place in a lesson on 3D objects, in a grade 7 class. The researcher had noticed that the learners appeared more organized during this lesson compared to the first cycle, with no learners out of their seats while T2 was teaching. This change was probed by the researcher who found interesting to note the change in T2's awareness of his practices. In the first cycle of recordings, it was noted how a group of learners were out of their seats and not attentive during the lesson. When that was brought up with T2 during the first cycle of interviews, it appeared as if this was a normal occurrence

and not much of a problem for T2. During the second cycle of interviews, T2 interestingly brought up the fact that there were learners out of their seats during the previous lesson. The following excerpt related to that:

> *I tried to … get them all glued … you know in comparison, you know to the first lesson, you know they were a bit more, they were more like free (Interview with T2, Second cycle).*

T2 was referring to his second cycle lesson, and how he attempted to keep the learners in their seats. He was now consciously aware that their previous conduct was not conducive for learning. This could be seen as T2 shifting out of a state of conscious incompetence, and moving towards a state of conscious competence, as he attempted to make changes to his practice. This is an interesting contrast to the first cycle, where T2 appeared to be in a state of conscious incompetence towards the learners' conduct. By the second cycle, T2 appeared to have reflected on this scene, possibly understood it differently now and decided that it was an area that he needed to focus on to improve his lesson. This was observed in the next excerpt:

> *I tried to make it more interesting for them… by breaking the shapes down, you know individually … and then of course you know putting it together… my whole thing was to see, … for them to see that there is a connection between two-dimensional shapes and three-dimensional shapes (Interview with T2, Second cycle).*

The second lesson cycle was based on 3D objects for grade 7. The above excerpt was related to T2 explaining his use of physical 3D objects, to demonstrate to his learners how the faces of the objects related to 2D shapes, a fact that the learners were supposed to have prior knowledge of. It was observed by the researcher that T2 was noticeably more prepared for the second cycle of lesson-recording, with an improvement in learner behaviour-management. It is also of note that the lesson commenced more promptly compared to the first cycle. T2 appeared to be more dressed-up than usual and had brought along 3D object models to use as visual aids during his lesson. Although dressing-up may not have impacted the lesson, the researcher interpreted this detail as T2 'preparing for the camera, as if the recording was being done for evaluative purposes. T2 definitely showed that he had reflected egocentrically on his previous lesson, as the above information could be interpreted as T2 having reflected-on-action, and this lesson was his attempt to change his practice in an area which he had identified as needing development. This could be observed in the next excerpt:

> *By making things more practical for them… I think learners learn so much better in something that's more practical instead of theoretical (Interview with T2, Second cycle).*

The above excerpt seemed to allude to T2 elaborating on the reason why he had brought the 3D shape models, to use as visual aids during his lesson. This was another interesting contrast of practice compared to the first cycle lesson. It appeared as if T2 reflected on the egocentric level when preparing for his lesson, in terms of how he could improve on the lesson through his teaching and attempted to make the lesson "more practical" for the learners. The previous lesson was different as T2 lectured the learners while writing the theory notes on the chalk-board for them to record in their books. Although T2 had made use of a large protractor as a visual aid in the previous lesson on measuring angles, there were no concrete examples of angles demonstrated by him. During the second cycle, T2 showed development by bringing concrete examples of 3D objects for his learners, in an attempt to make the lesson more practical. Previously, T2 reflected on a macro-centric level, and focused mainly on the lesson planning and policies attached to the curriculum. It appeared as if T2 shifted from the conscious incompetent state of development, towards the conscious competent state as he began implementing changes to his practice.

The researcher attempted to probe T2 on his reflection of his practices after exposure to the VSR study, and he responded with the following excerpt:

> *Very often… in the past… I would see with the results they (the learners) would give me, you know, from an informal test… to see whether they paid attention and whether they focused but …I enjoyed it so much more… being so practical you know in comparison to other times you know when I was not so practical (Interview with T2, Second cycle).*

To further elaborate on T2's attempt to change his style of teaching practice, T2 mentioned that previously he had given the learners informal class tests, and their results would be used to measure their understanding. and could possibly This reflection of the first cycle prompted him to realise that this area of his teaching needed development. It could be seen as T2 having reflected on his first lesson in the egocentric manner, which made him reflect on what he could do to improve the lesson and focused on himself as being the cause of the issue (of misunderstandings). This could be seen as an example of T2 shifting from the conscious incompetent state to the conscious competent state of development, as he was attempting to address the issues that he noticed during his reflection on the recorded lessons.

It was also observed that T2 mentioned that he designed his second lesson to be more practical compared to the first lesson. He was referring to the use of 3D object models as teaching aids, to make the mathematical examples concrete for the learners. During the

second cycle lesson, he attempted a new manner of assessing the learners' understanding by trying a more practical, concrete approach and using 3D object models. It could be seen as T2 reflecting on the first lesson and noticing that the learners might not have grasped the concept covered, by simply listening to his 'lecture' and recording the notes from the chalk-board into their books. T2 could be seen as realizing how his teaching practice could be developed to improve the conceptual understanding of his learners. This could be seen as T2 moving from the consciously incompetent towards the consciously competent, and into a state of confidence (Schratz, 2006).

T2 was probed by the researcher on why his reflection had influenced him to make his lessons more practical, as stated in the previous excerpt. He was not very direct with his response:

> *You know, being more theoretical because at this school… I noticed when I come from my previous school… I am not being prejudiced now but the children came from… a better social background than here, at this school here…whereas at my previous school, I mean my parents were all highly educated, they were lawyers, they were doctors, you know they were teachers etc. They were professionals but here at this school you know… our learners are not so gifted, you know, like my previous learners are (Interview with T2, Second cycle).*

The above quote was especially interesting as it was a clear example of how T2 had previously reflected in the macro-centric manner, and in a reflect-for-action manner, at which time he had set expectations. T2 mentioned that he had previously taught at a school where he claimed the learners were from a more educated background (as opposed to S1), and this, he claimed, made it easier for him to teach the mathematical theory. T2 could have developed a set expectation of what learners should know or be able to perform. When T2 identified that learners were lacking particular skills at S1, he initially did not attempt to change his style of teaching. In the first cycle it appeared as if T2 has just accepted that learners do not, and will not, fully understand, compared to the second cycle, where T2 attempted to change his style of teaching in order to reach his learners. This is what the researcher understood by the above excerpt in respect of why T2 had reflected on make the lesson more practical. This could be seen as an example of T2 reflecting through the egocentric perspective and shifting into the conscious competent state of development. The attempt to reach his current group of learners and to amend his teaching style is evidence of reflection-on-action, as T2 clearly identified an area of his own teaching which he felt needed development. T2 further elaborated on his view of making the lesson more practical for the learners in the next excerpt:

I prefer making things practical for them to teach because by making it practical it is concrete, it is there… they can visualise and of course… it makes sense to them... I mean, this man is actually showing me something now which makes sense to me… Like for example … if you look at three dimensional shapes, maybe I mean when they went to the shop their parents and then they could have bought an item. And of course, you know, I mean the box, the box now becomes something more meaningful. In terms of three-dimensional shapes. That mathematics is alive, you know it's something real. I mean, I mean it cannot be seen in isolation (Interview with T2, Second cycle).

T2 further comments on his change of awareness of his teaching practice, by elaborating on how making mathematics more practical for learners was the more sensible thing to do. Previously he had taught in a very ridged manner, strictly from exercises, and specifically commenting on how he always referenced the sources of his resources for lessons, and by the second cycle T2 felt that mathematics should be made more practical and that the learners should see the mathematics in real-life, and not in theory. This could've been identified when T2 viewed the first cycle lesson recording and reflected on the first cycle interview. This could also be seen as a period of reflection, allowing the teacher to be able to understand a lesson or scene better than what they did at the time (that it happened). It is through post-lesson reflection, or reflection-on-action, that T2 understood and was able to identify where he could improve or develop his teaching. VSR acts as a way to point to, and by, the teacher, which areas needed development.

4.10.5 T2 - Development through VSR and Reflection

T2 showed development through VSR in his reflection. In the first cycle T2 was very much focused on the planning of the lesson and the technical details linked to the lesson and was in a state of unconscious incompetence with regards to his reflective practice, and a state of conscious incompetence with regards to his teaching practice. It was also evident that T2 reflected mostly in the reflect-for-action manner. This could be explained that as a veteran teacher, he often reflected through this manner, as he taught the same concept for years and had a general understanding or expectation of the lesson outcomes as well as common misunderstandings (Green, 2006). This became a basis on which some veteran teachers may teach and could develop into teaching becoming a routine, instead of a specific group of learners and how they grasp the knowledge that you are teaching, being focused on. This

could result in the current contexts (the current class being taught) and learners' needs being ignored, and the teacher simply 'teaching the lesson' and not 'teaching the learners.

There was an interesting development between the first and second cycle, where T2 shifted from focusing on the expectations of the lesson, to focusing on how he could improve/develop on what he had observed (of his own teaching/lessons). It was also evident that T2 appeared to have interpreted the VSR study as the teacher being watched and evaluated, and it appeared as if this motivated him to improve his teaching. It could be said that T2's focus on lessening his perceived errors in his lesson was what motivated him to develop. The motivation for development came from feeling as if he was being watched and evaluated, and this could be seen as T2 reflecting-for-action, instead of reflection-on-action. It could be understood as T2 being in the unconscious incompetent state during the first cycle as he was very set in his manner of teaching and appeared to not be reflecting on the egocentric level at all. One could assume that exposure to VSR had affected T2's understanding of reflection and his own practices, as it was evident that T2 was becoming more conscious of the egocentric perspective, even mentioning that he had become "more aware" of himself, during the second cycle. This could be seen as a shifting of focus lesson planning and policies, to attempting to focus more on the current learners in the class, and how he could improve on their learning. Based on the latter, it seems that T2 shifted from a state of unconscious incompetence during the first cycle, and towards a state of conscious competence during the second cycle as T2 is observed to address the issues that he was aware of in his class.

4.11 Teacher 3 (T3) Reflections

The following excerpts are from the pre-training questionnaires and interviews conducted at S2, with T3. Due to logistical reasons, the interviews were conducted in a group setting with the mathematics team; both T3 and T4 were present. The interviews involved discussing video-recorded lessons of both T3 and T4, after watching the recorded lesson of each teacher. T3 was not present for the first cycle of video-stimulated interviews but was present for the second cycle. T3 taught a lesson on multiplication (using the column method)

for the first cycle of lesson recordings; the second cycle of video-recordings consisted of a lesson on equivalent fractions. Both lessons were taught for grade 5 learners. T3 conducted the first lesson by involving the learners in solving multiplication problems on the chalkboard. During the second lesson T3 incorporated the use of the whiteboard projector to display a video for the learners, explaining fractions. The second lesson, as compared to the first, comprised of less learner involvement.

4.11.1 T3 - View on Reflection

This section focused on T3's view of reflection, and how exposure to VSR may have shifted his perspective of reflection. This includes data which related to how T3 was reflecting on the video-recordings, and if any changes in his perspective were observed due to exposure to VSR.

First cycle

During the initial VSR training session, participants were also given a pre-training questionnaire (Appendix A) to complete. One of the questions asked if the participants used reflection in their classroom practice, and how often they practiced it. T3's response was as follows:

> *Yes, I do. It (reflection) helps to analyse the lesson, possible mistakes that occurred during the lesson and where I can improve (T3 pre-training questionnaire response).*

T3 stated that he used reflection in his classroom practice in order to identify possible mistakes during his lessons, and where he could improve in his practice. This was interesting as it was evident that T3 was already reflecting through the egocentric perspective and focusing on himself and how he was reaching the learners in the classroom. This was also observed in another response by T3 on what his understanding of reflection was:

> *Reflection helps me to gain insight as to where I can improve on the lesson…and what I can do to improve (T3 pre-training questionnaire response).*

The egocentric perspective of reflection was once again observed in the above excerpt, as T3 perceived reflection as being a tool that could be used to improve his own practice. This could also be an indication that T3 used a reflect-on-action type of reflection. as he claimed

to reflect in a manner which focused on how he could improve on an event that had already transpired.

4.11.2 Second Cycle

T3 had not been present for the initial interview cycle but was present when the second reflection was done by the mathematics team. The below excerpt is T3 commenting on how he thought his lesson had gone:

> *I just thought it was going to be bad; It wasn't too bad for me…the camera is in the background so you will never give capacity (give attention) like you always give or be free…you will later forget about the video (Interview with T3, Second cycle).*

T3's initial expectation of the lesson was not positive and this could be due to VSR being a new experience to him. T3 mentioned that being aware of the presence of a camera recording, could be a slight distraction but believed that after several lessons where VSR was incorporated, the teacher would not notice the camera anymore as one became used to its presence. This could be seen as T3 intended using VSR continuously as a tool for reflection in his practice. T3 could also be seen as reflecting through the egocentric perspective in this manner as it could be interpreted as him watching the recorded episodes and focusing on his own practice. Had T3 used the allocentric perspective, it could have seen him focusing on how the camera affected the learners, or the learners' reaction to it. There was no mention of that. The above excerpt could also be seen as T3 displaying aspects of insecurity, suggesting a state of conscious incompetence with regard to his development.

4.11.3 T3 - View on Practices

This section focused on T3's view on his practices, and how exposure to VSR may have shifted his perspective about his practice. This included data which related to T3 discussing his teaching practices, and if any changes in his practice and perspective were observed.

First cycle

As mentioned above, T3 was not present for the first cycle of video-stimulated interviews. I will give a short description of T3's first cycle of recorded lessons, for context. T3's recorded lesson began with a session of mental-mathematics multiplication. Mental-

mathematics is a technique of using warm up exercises to allow the learner to recall their prior knowledge before beginning with the formal lesson. This was carried out while the teacher wrote multiplication problems on the board, and asked learners to come up to the board to solve the problems. The lesson that followed, was on 'column-method' multiplication. Once again problems were written on the board, and learners were called up to the board to solve the problems. While two learners were called up to the board, T3 carried on giving the rest of the class an activity. The two learners at the board, appeared to have been struggling. T3 assisted the learners by prompting them. T3 did this by attempting to organize the learners' layout of their calculation (T3 drew the place-value table so that learners could see where the different digits should appear) in what appeared to be a clearer, more organized manner. The learners appeared to make progress and completed the problem on the chalk-board before receiving feedback from the class about their solution.

4.11.4. T3 - View on Practices:

Second Cycle

The lesson for the second cycle was on fractions for grade 5's. This lesson was conducted by T3 alternating between displaying a video that explained fractions, and T3 building on the learners' prior knowledge of fractions. The second cycle recorded episode did not include a mental-mathematics session, and it featured less learners interacting in the lesson, compared to the first cycle. The latter was commented on by T3 below:

> *Less interaction with the children… there weren't many flashcards on the board for the kids, I should have put more flashcards (on the board) … I just used the video…the guy with the camera didn't zoom in very well (Interview with T3, Second cycle).*

T3 admitted to noticing that the lesson featured less interaction between him and the learners. He commented on what he would have changed in the lesson i.e., more flashcards. This could be regarded as T3 watching the recorded episode with the intention of seeing where he could improve in his teaching practice and classroom environment. T3 identified the camera not zooming in well enough and this may be regarded as an indication of T3 being conscious of which parts of his lesson needed development. Although T3 reflected on the lesson in a critical manner, it appears that he was not reflecting through the egocentric perspective, as he had not yet made an attempt to address his own practice and development.

In the below excerpt, T3 was commenting on how he attempted to get learners to understand fractions through noticing patterns. This was observed as T3 attempting to show the learners the relationship between the different fractions through the use of a fraction wall during the lesson. The fraction wall demonstrated to learners which fractions were equivalent to one another. T3 appeared to make attempts at getting learners to notice the pattern in the fraction wall, and of how certain fractions were visually equivalent. This could be seen as T3 having predetermined expectations of the learners and their abilities:

> *It's a pattern they have to be able to follow, if you start with half, one is half of two and so three is half of six, five is half of ten, four is half of eight, two is the half of four – so a pattern…but the children, they look but they can't see. If you told them math is just a bunch of tricks, they have to look quickly and quickly see there is the pattern. The children find it a bit difficult - I have to repeat a lot sometimes too (Interview with T3, Second cycle).*

T3 was commenting on the pattern fractions and equivalent fractions that he attempted to get his learners to notice. He mentioned the pattern as halving numbers, so that one could recognize the connection to the equivalent fraction. T3 admitted to noticing that the learners struggled with grasping the idea of identifying patterns in the equivalent fractions. He stated that he thus had to repeat his technique of identifying equivalent fractions often, to encourage comprehension from learners. This could be seen as T3 focusing too much on what he believed to be an easy way to identify equivalent fractions, instead of revising his teaching practice in a manner which would reach the learners, especially since he was aware that the learners were not responding correctly. It appeared that T3 reflected on the lesson in the allocentric manner, focusing on the learner and not his own teaching practice. This could be noticed again when T3 referred to a learner not understanding the concept of equivalence of the fractions: "*Then I say it's the same, he just doesn't want to understand anything"*.

It was evident, once, gain that T3 'blamed' the learner for not understanding, possibly because he had a certain expectation of the learner's understanding. It could be seen as an expectation as T3 did not mention attempting to explain to the learner in a different manner or style, but simply stated that "it's the same". When the learner did not respond correctly, T3 reacted as if the learner misunderstanding by choice. This could be seen as T3 being in a state of unconscious incompetence development as he was not aware of, or identifying, any issues in his practice. This could be seen as an indication that T3 was reflecting through the allocentric perspective, instead of the egocentric perspective. The egocentric perspective

would have T3 reflecting on his own practice and how it could be amended for the purpose of ensuring that the learners understood the concepts.

4.11.5 T3 - Development through VSR and Reflection

There was not much to notice in terms of development in T3 as he only engaged in reflective discussions during the second cycle. An observation of T3's perspective of reflection based on his pre-training questionnaire, revealed an understanding of reflective practice. as a means of identifying areas or aspects of teaching practice that could be/needed to be developed or improved on. There were signs of T3 reflecting through the egocentric perspective during the first cycle (pre-training questionnaire), but this did not reappear during the second cycle. It was evident that T3 was focusing on aspects of the lesson which did not work but did not reflect through the egocentric perspective on what he could improve on, in his own teaching practice to avoid the same errors. Instead, we noticed T3 commenting that he noticed the learners lack of understanding the lesson, as if it was the learners' fault. This could be seen as T3 being in a state of conscious incompetence with regard to reflecting and reflecting-on-action.

4.12 Teacher 4 (T4) Reflections

T4 taught a lesson on number patterns (multiplication) for the first cycle of lesson recordings, and the second cycle of recordings consisted of a lesson on equivalent fractions. The lessons were taught to a grade 4 class. During the first lesson, T4 walked around the class with flashcards and selected learners to solve the number pattern problems on the cards. Learners were expected to complete the problem by reciting the relevant number pattern. The second lesson was conducted by T4 making use of visual aids displayed on the chalkboard which was understood as an attempt to demonstrate fractions to the learners. T4 involved the learners in the lesson by means of visual aids to assist in demonstrating equivalence, to the class. As mentioned before, due to logistical reasons at S2, the interviews were conducted as a group with the mathematics team, and T3 and T4 present. T4 spoke predominantly in Afrikaans during the interviews, but the transcriptions of T4 used for this section have been translated into English.

4.12.1 T4 - View on Reflection

This section focused on T4's view of reflection, and how exposure to VSR may have shifted her perspective of reflection. This included data which related to how T4 was reflecting on the video-recordings, and if any changes in her perspective were observed, due to exposure to VSR.

First cycle

During the initial training session, T4 had stated on her pre-training questionnaire that she used reflection in the classroom in the form of tests and activities. This was interesting as T4 appeared to focus on the learners, and how well they understood concepts, as a form of her reflection. Here we noticed how T4 reflected through the allocentric perspective, which focuses on the learner and how the learner perceived/experienced the lesson. Using tests and activities in class could possibly result in only finding out the learners understanding of the lessons but might not provide enough information for the teacher on how and where she could improve in her teaching practice. T4 added that: *"they are not yet so steadfast in multiplying two numbers" (first cycle).*

The above quote was from an excerpt; T4 was commenting on the learners' performance and comprehension in multiplication. The allocentric perspective did not allow the teacher to effectively reflect on her own self and generally led the teacher to reflect on the learners, and their experience of the lesson. The teacher also said the following:

> *A lot of that children…some have looked around, their attention was not there… while those two were busy and sir was helping them…(Interview with T4, First cycle).*

In the above quote, T4 commented on the attentiveness of the learners in the class during the lesson, and focused on the learners' lack of attention, instead of reflecting and looking back at herself, to understand the situation better. Teachers should ideally be the facilitators of learning in the class and reflecting through the egocentric perspective could allow the teacher to be able to notice which areas of their teaching they could develop, to possibly increase learners' attention to the lesson. The important factor here is to reflect on oneself as an outsider, so that one might be able to identify and notice anything that could enhance professional development. It could be seen as T4 reflecting in the conscious incompetent state, as she was aware of an issue existing, but was not making an attempt to address this issue. It appeared as if T4 was reflecting-on-action, which can be explained as T4 reflecting

on the lesson but not really having a plan. or could not identify what and how to improve on the lesson, to address the issues that she identified. There is a possibility that the egocentric perspective could assist T4 in reflecting on her own practices and how developing it may impact the attention of the learners during lessons. This could also result in T4 shifting from the conscious incompetent state of development to the conscious competent state of development, which means that have T4 would be practicing in a manner which would address issues that she noticed instead of letting it happen without taking action.

4.12.2 Second Cycle

The lesson for the second cycle was on equivalent fractions and it was taught to a grade 4 class. By the second cycle, the researcher could notice a slight change in the type of perspective focused on by T4, with her moving away from the allocentric and more towards the egocentric perspective. This was evident when T4 said the following:

> *I also realized afterwards that I now put a lot of emphasis on the word and vocabulary, the mathematical vocabulary (Interview with T4, Second cycle).*

T4 was discussing the importance of using the correct vocabulary when it comes to mathematics. Mathematics language is described by Oginni, Olabode and Thomas (2020) as being a collection of signs, symbols, abbreviations and units that is necessary for the teaching of mathematics. T4 was commenting on the use of the word 'equal' in equivalent fractions (i.e. $\frac{2}{4} = \frac{1}{2}$), and how the meaning would differ when using the word 'equal' in reference to the solution of a problem (i.e. 1 + 1 = 2). İncebacak and Ersoy (2022) argued that the correct use of mathematical language is important as each word has its own significance. It is argued that many teachers do not use mathematical language correctly, and this could be a reason why many learners struggle to understand certain concepts in mathematics. The researcher noticed that T4's focus moved from the learners' lack of understanding, to focusing on her own teaching practice. In the above excerpt, T4 noticed that she placed a lot of emphasis on mathematical vocabulary, and this could influence how well learners grasped concepts. This was an interesting observation as it showed that T4 was practicing reflection in the sense of reflection-for-action. The fact that T4 had a realization after her lesson shows that she reflected on the lesson afterwards, and how she could have improved on it. It is also possible that during the first cycle, T4 noticed that she did not put sufficient emphasis on mathematical vocabulary and acted on it in the second cycle. This could then illustrate an improvement by the teacher due to taking action after reflection in the first cycle. It could

also be an indication that T4 shifted from a state of conscious incompetence to a state of conscious competence. As she began placing an emphasis on mathematical language by the second cycle, served as an indication that T4 was reflecting in a manner which encouraged her to act on the reflections. The fact that T4 had reflected on herself, and not on the learners' actions, showed that she was reflecting from the egocentric perspective. It could be seen as a move away from the unconscious incompetent stage in terms of emphasizing mathematical vocabulary, and a shift to the consciously incompetent state, when she became more aware of her practice in terms of mathematical language. Once T4 began making an effort to address the issue that she identified, it could be seen as a shift to a consciously competent state by being more deliberate in focusing on the mathematical vocabulary.

As T4 continued to discuss the importance of the use of language in mathematics, she also mentioned that she came down to their (the learners) level. This means that she tried to see the lesson from the learners' point of view and attempted to understand things in the way that they would. This meant that she started to understand that she could not assume that the learners understood the difference between mathematical language and using the words in the form of language communication. This could be seen as T4 looking back at herself through an 'outsiders' eyes, so that she may reflect without any personal bias. This is also an indication of T4 reflecting through the egocentric perspective, as she attempted to focus on how she could develop her own practice to reach her learners more effectively. The egocentric perspective allows the teacher to be able to focus on their own practice and what could possibly be developed, in order to better reach the learners, instead of simply blaming the learners for not understanding. The egocentric perspective through reflection is also evident in the quote below:

I didn't give the lesson as well as I wanted to give it (Interview with T4, Second cycle).

Once again, we notice how T4 was critical about her lesson in terms of herself and how she felt she delivered it. Instead of identifying the learners as being the reason why her lesson did not go as planned, T4's perspective appears to be focused on herself. This shows that T4 was reflecting through the egocentric perspective. T4 reflected on the video-recording and noticed certain aspects, which she felt needed improvement or development. This is an indication of T4 reflecting-on-action as she was reflecting on the event that had already occurred and was critically reflecting on how she could've improved the scene. This scene will be further elaborated on, in the View on Practices, second cycle section.

4.12.3 T4 - View on Practices

This section focused on T4's view on her practices, and how exposure to VSR may have shifted her perspective on her practices. This includes data which related to T4 discussing her teaching practices, and any changes in her practice and perspective which may have been observed.

First cycle

The lesson was on number patterns for a grade 4 class. The researcher observed T4 beginning the lesson by incorporating flash-cards with various problems on each card, relating to number patterns. Learners were expected to provide the number pattern solution to the card after T4 called on them individually. The lesson recording observed T4 selecting one learner at a time and showing the learner the flashcard with the problem on it. The researcher found it interesting to note that the flashcards were not being displayed in full, with clear view for the entire class to observe. In the excerpts below, T4 was commenting on observations from both T3 and T4's lessons. This was due to the lesson recordings being compiled as one video, and the interview cycles conducted as a group at S2. In the excerpt, T4 was commenting on an episode where two of T3's learners were solving a multiplication problem on the board:

> *... they are not yet so steadfast in multiplying two numbers and with two numbers in the column method not where he must go transfer to the next place value. And then uh, those two kids that stood there they actually did nothing... there was no modeling discussions about how I (the learner) got there (Interview with T4, First cycle).*

T4 immediately commented that the learners were not able to skillfully solve a multiplication problem on the board. Although T4 was able to notice very quickly where the learners were lacking, she did not reflect on this scene through the egocentric perspective, as she was more focused on the errors of the learners, instead of on how scenes like that may be avoided through the intervention of the teacher. T4 made comments on what she thought the learners were failing to do but did not appear to comment on what could be done as a teacher, to improve what transpired in the scene. Although T4 was being critical of the scene by analyzing the method that the learners were attempting, she did not appear to reflect in a manner conducive to her development. This could be seen as T4 commenting in a state of unconscious incompetence:

A lot of that children…some have looked around, their attention was not there… while those two were busy and sir was helping them…I would have written a little problem on the board…to keep them (the learners) busy (Interview with T4, First cycle).

The researcher observed that T4 had commented more on what she had observed in T3's recorded lessons, and not so much on her own recorded lessons. T4 commented on the learners' lack of focus in class, as they were looking around instead of working. In this scene, T3 was busy helping two learners, while the rest of the class was expected to work independently. T4 commented that in these instances she usually wrote a problem on the board for the rest of the class to engage in while she helped learners. This was done in order to keep the learners busy. This could also be seen as T4 reflecting in the allocentric manner, focusing on the learners. With the egocentric perspective, T4 would have reflected on how to develop the lesson, so that learners did lose focus or look around the classroom instead of working.

... And then I will, for example, when they struggled there, "look quick there in you file" ... you have to get the learner accustomed to returning to previous work… "scroll through that timetable that I you gave"… And then there was more children involved in the lesson (Interview with T4, First cycle).

In the above quote, T4 was explaining what she would usually do when learners struggled with certain aspects of work. Instead of recapping the lesson, or presenting the lesson in a developed manner, T4 simply instructed the learners to look back in their mathematics files and return to previous work covered. T4 believed that this strategy could involve more learners in the lesson.

Sometimes the learners are struggling with the column so you can maybe give them a different method they can do and in the end they can chose which one they are comfortable with (Interview with T4, First cycle).

Although T4 instructed learners to return to previous work completed in class if they struggled with certain methods in class, she also included that she provided learners with a different method in which to solve problems. T4 believed that the learner could then choose whichever method they were comfortable with.

I think whiteboards will be a nice one for the kids because for him to go and stand in front of the board and write the calculation on the board every time, where they can sit you know separately with their whiteboards (Interview with T4, First cycle).

In this quote, T4 was commenting on the learners having to go to the board in the front of the classroom in order to solve problems. T4 commented that if each learner had their own whiteboard to solve problems on. at their desks, things would be much easier instead of learners having to solve problems on the same board and take turns. This could still be seen as T4 reflecting through the allocentric perspective, as she focused on what the learners could do in order to further develop. The egocentric perspective would have caused T4 to focus on herself and how she could improve and develop her lessons. It could also be seen as T4's confidence in her teaching practice that might be causing her to not reflect on further develop or improvement.

The researcher attempted to probe T4 on her reflections of her own lessons. T4 commented that she could only identify one aspect that she would improve on in her lesson:

> *I could, for example have said the child must read the sum (the problem) - read and then give the answer… that's it. So that the other learners also can know what is being read and they can also make a connection with the answer given (Interview with T4, First cycle).*

T4 was commenting on her use of flash-cards. During her lesson, she had walked up to the learner that she had selected and showed them the flash-card close up. It appeared as if T4 had reflected on that scene and realized that it would have been useful if the entire class was aware of what question was being displayed, so that they could make the connection between the question and the answer that the learner provided. This was evidence of T4 reflecting-on-action in the egocentric manner and could be seen as T4 shifting out of the state of unconscious incompetence, to a state of conscious incompetence as she was now acknowledging faults that became evident.

T4's reflection on her lesson further developed as the discussion continued, as she began suggesting more ways in which she could improve her lesson. The researcher found it important to note that as the discussion progressed, T4's perspective of reflection seemed to shift from the allocentric perspective to the egocentric perspective. as she started observing her own practices and how these could be improved. This was further evident in the excerpt below:

> *If, for example, you say start there - it's number one , two and three - you give him (a learner) a page – and tell that child to start at number five…So that the position that he starts from is not from the same position (as the other learners)…So he must know the position and he must know order of the numbers (Interview with T4, First cycle).*

T4 was identifying further developments that she felt could have improved her lesson. In the recorded lesson, T4 was selecting individual learners to solve a number pattern problem on a flash-card. Once the learner had given the solution, T4 selected a new flash-card with a different problem and selected a different learner to solve the number pattern on the new flash-card. T4 discussed that she should have given a learner a number pattern problem and allowed the learner to provide the sequence solution, and then she should have selected a different learner to continue with the sequence at a different position in the number pattern. This could be seen as T4 reflecting-on-action in an attempt to involve more learners in the activity.

4.12.4 Second Cycle

T4's second lesson was on equivalent fractions for grade 4. By the end of the first cycle interview, it was clear that T4's perspective had changed slightly, compared to her initial observed perspective. In the first cycle interview, T4's focus was on the learners and their errors but as the discussion progressed, T4 was observed as identifying aspects of her own practice, which needed development. By the second cycle, T4's perspective was observed as focusing on herself and how she could improve and develop. This could be seen as T4 reflecting through the egocentric perspective. In the lesson on equivalent fractions, T4 commented on an activity which she did not manage to get her class to do themselves. This activity consisted of the learners cutting out a shape of an apple and dividing the apple into equal parts. This was understood as an intention to demonstrate fractions through real-life examples. The researcher found it interesting to note that T4 was reflecting-for-action around this activity, and how she would have improved it. T4 was asked how she thought her lesson went and responded as follows:

> *I didn't give the lesson as well as I wanted to give it. Um, I wanted to give my introduction to paste and cut first for each one but I didn't get around to it now. I did it with the other classes but now I don't have it for the class. This is what I missed but I used the apple and I cut it like this so that they can see the two different parts and that it has equals. And um, yes it would have been wiser for me and maybe for the learners if I had maybe an easy shape like a square where you could fill it exactly even up, or maybe a rectangle or something like that. And then I could have seen for myself how many parts he fills (Interview with T4, Second cycle).*

In this excerpt, T4 commented that her lesson did not meet her expectations of how well the lesson went. T4 was reflecting on the activity that she wanted to give the learners to do independently. which involved dividing a shape of an apple into equal parts, with the

intention of teaching the concept of equivalent fractions. T4, instead, conducted the activity with the class as one group. After reflecting, T4 realized that it would have been better (for her learners' understanding) if she used a more symmetrical shape than an apple, such as a square. She reasoned that a square would be simpler to cut up and divide into equal parts. It could be said that T4's reflection assisted her in identifying the areas of her lesson, which could be improved for the benefit of her learners. The difference between the initial and the second cycle was that T4 became more focused, reflecting on where she could have improved on, in her lesson and what she, as the teacher, could have done differently. This could be seen as T4 shifting from the allocentric perspective to the egocentric perspective, as she was focusing on aspects of the lesson which involved her and her practice. It was becoming clear that T4 was in a state of conscious incompetence when it came to her development. During the first cycle T4 was observed as initially being in a state of unconscious incompetence, but then a shift towards the conscious incompetent state became evident as T4 began identifying areas of her practice which she agreed, needed development. This conscious incompetent state of development is apparent in the above excerpt; It Is of note that T4 also focused on how she could improve her lesson and practice.

During the first cycle, it was observed that T4 was not really involving the entire class in the activity that was conducting. She selected certain learners and these learners became the centre of attention. During the second lesson, T4 was observed as making an attempt to involve more learners in the activity. T4 selected a few learners to stand at the front of the class, and attempted to use these learners to demonstrate fractions in a real-life context.

T4 attracted the rest of the class's attention to the heights of the learners, and how two girls were the same height. This was an attempt to demonstrate equivalence to the class as the girls' height were equivalent to each other. It was also clear that T4 critically reflected on her practice during the lesson, as indicated hereunder:

> *... there I flopped a bit. I had the four learners but I actually should have brought boys as well where I could possibly have seen these are now the learners and how many boys are here together, how many girls are here together (Interview with T4, Second cycle).*

In the above quote, it is once again observed how T4 critically reflected on her lesson practice, even commenting that she (and not the learners) was unsuccessful ("I flopped"), and again commenting on what she considered that she should have done differently in order to present an improved lesson. T4 was referring to her realization that while she was using the

learners to demonstrate equivalence, she could have selected boys as well to mix the selected group in terms of gender and allow the class interpret the number of boys and girls as fractions. This is further evidence of T4 being in a state of conscious incompetence with her development as she became aware of the aspects which she realized needed development or improvement. The insecurity of this state can also be noticed in how critical T4 became of her practice, instead of being in a comfort zone, and not noticing any need for improvement. The reflection that T4 had about her practices could be seen as reflection-on-action, based on what she observed, and how she interpreted her observations.

Continuing the discussion of the above scene, T4 also made the following comment about her questioning technique:

> *I asked but I didn't make it so clear now... which fraction, I didn't bring that in, I just asked how many and so on... I didn't bring that in, I said that but ...you must be confused (Interview with T4, Second cycle).*

In the above quote, T4 noticed that the learners seemed confused and that it was due to her way of teaching, and not their understanding. Although T4 might not have been aware of why her learners did not understand fractions during the lesson, she began to understand why through reflecting on the lesson afterwards. Although the lesson was on fractions and T4's question was about searching for a 'fraction answer', T4 did not use the specific terminology and instead asked "how many" to her learners. instead of specifying "which fraction". T4 realized that this could have caused confusion in her learners, as they would then be focused on searching for an amount, and not a fraction. This is once again an example of T4 having noticed the importance of using the correct mathematical language. This could be seen as T4 reflecting through the egocentric perspective and identifying aspects of her teaching practice that could be improved or further developed.

T4 was probed to comment on the success of using the learners as an example to demonstrate equivalent fractions. and responded as follows:

> *I don't think it's a success, but what I finally want to have brought home is that they can see that when I talk about a whole, we're dealing with equivalent so it must be equal, so all those learners did not have equal height (Interview with T4, Second cycle).*

T4 stated that she did not think that the demonstration that she provided for her learners was successful in bringing across the concept of equivalent fractions. Although she said that the message was brought across that the learners were not of equal heights, she still identified

that the demonstration could have been improved upon, to be successful. She, however, did not blame the learners or try to identify what the learners were doing wrong. It could be seen, once again, as signs of T4 reflecting through the egocentric perspective as she looked back at her lesson as an 'outsider' and tried to identify what could be improved.

The shift from the unconscious incompetence (not being aware that development is needed) moving towards conscious incompetence (being aware that development is needed) occurred when T4 began reflecting on what she would change and do differently in the following lessons. Green's (2006) suggests that the type of reflection that T4 displayed can be explained in terms of the Centric model of reflection as being 'reflection-on-action". This is explained as the teacher reflecting on the lesson that had already been delivered, with the purpose of identifying areas that may need development or improvement.

4.12.5 T4 - Development through VSR and Reflection

Initially during the first cycle, it appeared as if T4 was focusing mostly on the learners' errors and learners' habits and reflecting through the allocentric perspective. T2 was also observed as being very focused on what the learners should have done better when reflecting on the recorded lessons and appeared to be in a state of unconscious incompetence with regard to her development in reflection, and unconsciously incompetent with regard to her development of teaching practice. It was also evident that T4 reflected in the reflect-for-action manner. This is similar to T2, also a veteran teacher and, as mentioned before, veteran teachers often reflect through this manner as they have taught the same concept for years and have a general understanding or expectation of the lesson outcomes, as well as common misunderstandings (Green, 2006). T4, however, showed a shift in development during the first cycle, and this carried through into the second cycle of interviews. The researcher observed that T4's focus shifted from the learners' errors and what the learners should have done better, to how she could improve/develop (based on what she had observed (of her own teaching/lessons). It could be interpreted as T4 shifting from the unconscious incompetent state of development during the first cycle and moving towards the conscious incompetent state of development as she became more aware of her practice. This conscious incompetent state of development was further observed during the second cycle of interviews. It could be seen that exposure to VSR had affected T4's understanding of reflection and awareness of her own practices, as during second cycle that T4 was reflecting more through the egocentric

perspective by focusing more on aspects of herself and her practice, that needed development.

4.13. Summary of Reflections

The study observed that the participants developed at varying paces to one another. There were participants who were observed to have shown growth in their state of development, which assisted them in gaining a new perspective on reflection and their teaching practice. However, not all participants developed equally. There was a participant who appeared to remain in an unconscious incompetent state of development, and this could be an indication that this participant did not benefit ideally from being part of the group who were exposed to VSR. The rest of the participants, however, showed development to a certain extent, and it was clear that exposure to VSR, and involvement in the study benefited the teachers in assisting them to shift their perspective, which made it conducive for development.

The following chapter will discuss the findings and conclusions of this study. These will be discussed in terms of how, and to what extent, the exposure to VSR affected the mathematics teachers' perspective of reflection; how, and to what extent the exposure to VSR shifted their perspective of their own practice, and how, and to what extent, the participants developed through exposure to VSR.

In the following section, themes observed in the data, as well as further recommendations for future studies, will be discussed.

Chapter 5 Findings, conclusions, and recommendations

5.1 Findings

The data analysis was discussed in the previous chapter. The data was analyzed to find possible answers to the research questions: How, and to what extent, does the exposure to Video Stimulated Recall (VSR) affect the mathematics teachers' perspective of reflection?

Sub-questions:

1. How, and to what extent, did the exposure of mathematics teachers to VSR, shift their perspective of their own practice? 2. How, and to what extent, did the mathematics teachers develop through their exposure to video stimulated recall as a reflective tool?

Data collection took place in two public schools in the Western Cape, with the study focusing on two mathematics teachers from each of the aforementioned schools. The data collection tools used were questionnaires, video-recorded lessons, and transcriptions from video-stimulated interviews. There were some findings and conclusions that developed from the analysis of the data, discussed in this chapter. The researcher also identified limitations and possible recommendations for future study. The findings will be discussed under the following headings:

- Teachers' perspectives of reflection
- Teachers' perspective of their practice
- Development of teachers through VSR

5.1.1 Teachers' development of perspectives of reflection

The study revealed that exposure to VSR caused the teachers to shift their perspective towards the egocentric perspective although not all teachers approached the initial training by viewing reflection from this perspective. However, it was evident that these teachers shifted to the egocentric perspective after the video-stimulation. This could be due to the teachers seeing themselves on video from a different point of view, and because this caused them to reflect in a more critical manner. It was evident that once the teachers saw themselves from a different point of view, it allowed them to notice aspects in their teaching which they had not noticed before (Muir, 2010; Pellegreno and Gerber, 2012; Geiger, Muir and Lamb, 2016). The reflect-on-action style of reflection that the VSR interviews used, could be seen as being

responsible for drawing the teachers' attention to certain aspects of their practices, of which they may have had different expectations (Green, 2006). Each teachers' development of their perspectives of reflection will now be discussed under the respective teachers' headings.

5.1.1.1 T1's development of perspectives of reflection

It was found that T1 approached the study with an allocentric and macro-centric perspective dominating her way of reflecting. This could be seen as T1 focusing on the learners and lesson-planning, as aspects of the lesson which should be reflected on for improvement. T1 appeared not to reflect on herself as being an aspect that could require change or improvement. Development of this was observed during the first cycle, and T1 was observed as started being more aware of herself as an agent of change. At this point the researcher noticed how T1 shifted towards the egocentric perspective, as she started focusing on aspects of her practice and conduct that she could improve on. An example of this could be when T1 conducted a lesson on time. It was only after viewing the recorded footage that T1 became aware of certain errors she had made throughout her lesson. It was clear that T1 became more interested in checking for more 'errors' appeared in her teaching, causing her to be more aware of her own practices. This is an example of how T1's perspective of reflection changed to the egocentric, and how she became more focused on her own actions and conduct as a teacher. This could be seen as an indication that T1 showed development in her perspective of reflection.

5.1.1.2 T2's development of perspectives of reflection

T2 was found to approach the study with a macro-centric perspective of reflection. This was evident in how T2 appeared to be more focused on the lesson planning, and what his teaching advisors had taught him many years previously. The researcher found it interesting that T2 focused on this detail (teaching advisors) as it could be regarded as T2 not reflecting on himself as a teacher, through the egocentric perspective. There was an interesting development regarding this, after T2 was exposed to the video-stimulation. It appeared as if T2's perspective was shifting towards the egocentric perspective as he began developing his focus more on himself and his conduct. Initially, T2 appeared not to involve himself in his reflection process in terms of requiring improvement, as he was still following and adhering to what his 'advisors' had taught him to do. As he mentioned this, it seemed as if T2 believing that his practice was faultless as long as he adhered to what he was taught by his advisors many years ago. (It has to be emphasized that his interaction with his advisors

happened years ago, to highlight that this was not an ongoing process). Continuous professional development (CPD) is regarded as an ongoing, sustained process is mentioned by D' Ambrosio, Harkens and Boone (2004) as being vital for development to be successful. T2 did not mention reflection, or professional development being an ongoing process. CPD needs to be a continuous and sustained practice to prevent teachers' development from stagnating, which could result in lower quality of teaching for learners (Chirinda & Barmby, 2017). Reflective practice is an ongoing process is especially vital for mathematics teachers, and Yazlik, Gedik and Kaya (2022) are of the opinion that teachers need to have reflective thinking skills to effectively reach the objectives of mathematics education. Another interesting detail was that it appeared as if T2 understood development as being an evaluative process. Luneta (2012) proposed that many teachers do not see CPD as a means of developing professionally, but instead see it as a means to measure or evaluate their performance. This could be a further indication of T2 being in the unconscious incompetent state of development, as he appeared to be in his comfort zone as long as he followed what his advisors had taught him.

5.1.1.3 T3's development of perspectives of reflection

It initially appeared as if T3 had approached the study with an egocentric perspective. This was due to his response in his questionnaire. regarding his view of reflection, as he responded that he used reflection to identify errors in his teaching, that he should correct. It is also noted that T3 viewed that reflection as a tool used for development and identification of areas of one's lessons that required improvement. The researcher found it interesting to note that T3's perspective during the video-stimulated interview was not egocentric. Had this perspective been followed, T3 would have focused on his own practice and development thereof. Instead, T3 was focusing on other faults besides himself. This could be an indication that T3 was reflecting through the allocentric perspective, as he was focused on attempting to view the lesson from the learners' point of view (Green, 2006). By way of example, T3 commented on the learners not being able to notice the pattern in number patterns. Although the concept may have seemed simple to T3, based on observations during the sessions, he had not reflected from the egocentric perspective and on what he could have done in his practice so that learners would be able to notice the patterns. There was, however, a scene where T3 could be seen as reflecting through the egocentric perspective, when he commented on what he would've done differently with the flash-cards that he used for the lesson. T3 believed that he used too little flash-cards and should've provided more for the learners. This could be seen

as reflecting through the egocentric perspective, as T3 was reflecting on what he could've done to improve the lesson. As mentioned previously, T3 was not present for the first cycle of the study. This detail, and as he was subsequently exposed to VSR for a shorter period of time than the rest of the participants, could be seen as T3 not having been exposed to VSR for long enough for further development of the perspective of reflection to be observed.

5.1.1.4 T4's development of perspectives of reflection

When T4 approached the study, she initially appeared to be more learner focused. As the study progressed and T4 became more exposed to VSR, it was observed that her perspective began shifting towards the egocentric perspective as she became more aware of herself and her conduct. T4 was observed as shifting from the unconscious incompetent state of development, towards the conscious incompetent state of development as she began to become aware of areas of her practice and conduct which required development. This took T4 out of her comfort zone; she was viewed as having been in a state of insecurity as she began reflecting on her lessons in a more critical manner, as if she was more aware of flaws existed in her practice. According to Mann et al. (2009), reflection is a process which is stimulated by an awareness of a need or disruption in daily practice; similarly, VSR stimulated T4's awareness of a need for development in her practice. Pellegreno and Gerber (2012) maintain that the use of reflection by means of VSR encourages reflective behaviour, and this could be observed in how T4 began reflecting, by the second cycle of the study.

5.1.2 Teachers' development of perspective of their practice

It was found that exposure to VSR encouraged teachers to shift their perspective of their practices. A common trend was that teachers approached the study with the belief that there was no fault in their practice. As the study progressed, the researcher noticed how teachers appeared to become more aware of their practice and started critically reflecting on their practice and conduct, with some even reflecting on how their practice could be improved or further developed. It could be said that exposure to VSR allowed the teachers to be able to see themselves from a different point of view (and not based on their own expectations), and this assisted the teachers in being able to reflect on their practices. Each teachers' development of perspective of their practices will now be discussed under the respective teachers' headings.

5.1.2.1 T1's development of perspective of their practice

The data showed that T1 had initially been in an unconscious incompetent state of development when it came to her practices. This was indicated as T1 appeared unaware that her practices required development or improvement. This could be due to lack of reflection through the egocentric perspective, in which case she would have been focusing on how changes to her own practice may have improved her lessons. Exposure to VSR showed that T1 began noticing the aspects of her lesson which needed improvement, and this could have influenced her to make the necessary changes to her practice. Gaudin and Chalies (2015) propose that exposure to VSR allows the teacher to reflect on their own practices and identify where changes can be made. It appeared as if exposure to VSR caused T1 to shift into the conscious incompetent state of development, where she realized, and was now aware, that there were areas of her practice which needed development and improvement.

As the study progressed to the second cycle, it was evident thatT1's state of development seemed to shift towards the conscious competent state as she started implementing the changes in her lessons, in areas which she had identified that needed improvement, during the video-stimulated interviews. It could not be said that T1 was in a state of conscious competence as she was not yet in a state of confidence with regard to her practice. The latter was based on her growing awareness of the need for development in her teaching practice by the end of the study. Although T1 was observed as making changes to her practice through her reflections, the changes were not cemented into her practice yet, therefore it can be said that T1's state of development in respect of her practice was still in the conscious incompetent state.

5.1.2.2 T2's development of perspective of their practice

T2 appeared to approach the study in the unconscious incompetent state of development with regards to his practice. This could be seen as T2 seemed to be unaware that his practice needed any development, as he believed that he was already practicing in the 'correct' manner by following his previous advisors' instructions. It was observed that T2 became aware of issues in his classroom after exposure to VSR, but he did not explicitly mention identifying any areas of his practice as being an issue. It appeared as if T2 was avoiding reflection of his practice. Although T2 was not critical of his practice, the researcher noticed that T2 became more aware of himself through exposure to VSR. This became

evident as he commented on the presence of a camera recording his lesson, and that it forced him to be more aware of his practice and conduct.

Even though T2 did not explicitly reflect on his practice, it cannot be said that T2 was in an unconscious incompetent state of development, based on his comment regarding the camera watching him teach which could be regarded as an awareness of the faults or areas of his practice in need of development. As a result, one could state that T2 was in a conscious incompetent state of development, as he was taken out of his comfort zone and started to notice that his practice required development. Although T2 appeared to have shown development in the second cycle, the researcher observed that these areas of development were not focused on improving aspects of the lesson that learners struggled with. An example of this was when T2 used visual aids in his lesson to demonstrates what he was trying to teach. T2 was aware that an issue existed in learners' understanding of how to practically use the mathematical measuring equipment (rulers, protractors). However, he did not address the issue, and instead focused on other aspects of the lesson, which was guided by his lesson planning. This could be seen as T2 remaining in the state of conscious incompetence. It would have been more effective for T2's development had he focused on the issues that the learners were struggling with. Khoo et al. (2022) explained that reflection should be used by the mathematics teacher in order to become aware of the struggling learners, and to then make attempts to reach them. This was unfortunately not observed with T2.

5.1.2.3 T3's development of perspective of their practice

Due to T3's absence during the first cycle, the data showed that there appeared to be a gap, or break, in T3's development of perspective of his practice. It was noticed that T3's perspective of his practice was in a state of unconscious incompetence as he was not showing signs of identifying aspects of his own practice, that needed improvement. Instead, T3 focused on the learners' misunderstandings as the issue at hand. This could be due to the fact that he was only exposed to VSR for one cycle. There is a possibility that had T3 been involved in both cycles, he could have been influenced by the video-stimulation to the extent that would have started noticing aspects of his own practice which required development. Pellegreno and Gerber (2012) stated that the use of reflection, using video-recordings encourages reflective behaviour, and this is what leads the researcher to believing that more exposure to VSR would have influenced T3 to reflect further about his practice, through the egocentric perspective.

5.1.2.4 T4's development of perspective of their practice

T4's perspective was observed to have changed from the allocentric to egocentric perspective. Initially, T4 appeared to be more focused on the learners and what they were doing wrong or lacking. T4 showed development during the first cycle by becoming more focused on her own practices and how it may affect her learners' understanding of the lesson. It could be an indication of a shift from the unconscious incompetent state towards conscious incompetence during the first cycle, as she was beginning to identify aspects of her practice which needed development. She was aware that issues existed in her own practice, which affected the learners' understanding. Then the researcher observed how T4 attempted to shift into the conscious competent state of development, by attempting to address the issues that she identified. T4 was observed to comment on the attentiveness of learners during the first cycle. The shift to the conscious competent state can be observed during the second cycle as T4 addressed the learners' attentiveness by attempting to involve more learners in the interaction of the lesson. This shift was based on her reflecting-on-action and realizing what would work better in her class. T4 became aware of what she should have done, and then implemented it. This could be due to her seeing her lesson from others' point of view, and noticing that it needed improvement. Similarly, Geiger, Muir and Lamb (2015) maintained that a teachers attempt to improve on their practice is related to how their practice is viewed by others. VSR assists teachers by being able to see themselves and their practice, how others see it.

5.1.3 Development of teachers through VSR

The findings could be seen as teachers showing development through exposure to VSR. Although all teachers did not develop at the same pacer, the researcher noted that development after exposure to VSR was observed in all teachers at varying extents. In this manner, VSR created an awareness in the participants which resulted in shifts of their various states of development. Each teachers' development through VSR will now be discussed under the respective teachers' headings.

5.1.3.1 Development of T1 through VSR

T1 showed development through VSR. This could be seen in the manner in which her initial allocentric and macro-centric perspective of reflection shifted to her increasing

awareness of the egocentric perspective and reflecting in an egocentric manner. This was evident in how T1 began reflecting on her own practice, and how it could be improved to be more effective. T1's state of development was also observed as shifting through the stages of development. It was observed that T1 approached the study in the unconscious incompetent state of development. This could be explained as a lack of awareness on her part, regarding areas requiring development in her practice, or believing that no improvement was required. This was based on T1's admission that reflection initially only took place in terms of reviewing the lesson planning. It was observed how T1 shifted into the conscious incompetent state when being exposed to VSR. This was based in T1's apparent awareness of her practice, after watching the video-recordings of herself. This awareness caused by VSR made T1 aware or clarified the areas to focus on and T1 gained the understanding that there were indeed areas of her practice which could have been improved to achieve more effective lessons. This awareness of could be interpreted as a shift into the conscious incompetent state, and a move into a zone of insecurity, as she began identifying areas which required development.

It was also observed that T1 did not remain in a conscious incompetent state, as she made an effort to act on and conduct changes in her practice, to improve on areas that needed development. This resulted in a shift towards the conscious competent state as she practiced in a manner which was guided by her reflections of her practice. Geiger, Muir and Lamb (2015) suggested that teachers' attempts to improve their practice, are related to how they are seen by others, instead of how they see themselves. Based on the latter, VSR assisted T1 to see herself how others see her, and this awareness influenced her to improve her practice. The researcher found this interesting as it appeared as if VSR had assisted in shifting T1's developmental state from the unconscious incompetent to the conscious competent state. T1's state could be interpreted as the conscious competent state of development, by the end of the study, as she was observed to not only be aware of the issues in her practice and class, but addressed them as well, by implementing the necessary changes. T1 shifting into a state of confidence as she became aware of exactly what was that needed to improve.

5.1.3.2 Development of T2 through VSR

Although T2 appeared to avoid reflecting, the researcher could see that development was observed to a relative extent. T2 appeared to have a macro-centric perspective of reflection when he approached the study. This was evident in how T2 referred to how he

followed instructions from his teaching advisor from previous years, and how he referred to the importance of resources, but did not reflect on his teaching practice and how it could possibly affect his lessons and learners' understanding of it. As T2 became more exposed to VSR, he appeared to show development in his perspective, and showed evidence of using the egocentric perspective. Although T2 did not make much mention of identifying aspects of his practice which needed development, the researcher found it interesting to note that the egocentric perspective was evident when T2 commented on VSR making him "more aware of yourself". The researcher considered this awareness as a change in T2's perspective, thus showing development as a result of VSR. T2 could be regarded as having shifted from the unconscious incompetent state of development where no reflection was taking place, to the conscious incompetent state of development which increased his awareness of his practice.

5.1.3.3 Development of T3 through VSR

T3's absence for the first cycle of video-stimulated interviews meant that T3's development could not be as accurately tracked as the others. Although T3 displayed an egocentric perspective of reflection for the pre-training questionnaire, during the second cycle it waws evident that T3 displayed an allocentric perspective. This was reflected in the fact that in T3 noticed issues in his lesson and focused on the learners' misunderstandings but did not reflecting in a manner that opened himself for future development. This could be an indication that T3 was in an unconscious incompetent state of development. T3 admitted to being aware of issues in his class but did not reflect on how he may improve to address the issues. Although it can be argued that T3's awareness of issues in his class would place him in a 'conscious' state, it can also be argued that the awareness of the issue did not translate to T3 being aware that he was linked to the issue i.e., T3 did not appear to be aware that the learners' misunderstanding could be influenced by his teaching practice. Yazlik, Gedik and Kaya (2022) discussed the importance of the influence of teaching, and stated that teachers must always reflect on their teaching practices in mathematics, as it is a subject requiring that teachers have reflective thinking skills, to effectively reach the objectives of mathematics education. This was not evident in T3.

5.1.3.4 Development of T4 through VSR

T4 showed development through exposure to VSR. This was seen in how T4 showed development in her perspective of reflection; T4 became more focused on herself, and how she could develop or do things differently to improve on her lessons. She had initially

appeared as being focused on the learners, but it was observed that her perspective began changing upon viewing the recordings and watching herself, when she began noticing issues in her practice. This is what Philipp et al. (2007); Geiger, Muir and Lamb (2016) were referring to when they discussed VSR as assisting teachers in noticing aspects which they had not noticed before. T4 also showed attempts at addressing these issues that she had identified. Biccard (2019) suggested that a teacher may use reflection in order to improve their practices, and T4's use of VSR could be seen as an example thereof. For example, in an effort to address the issues at hand, T4 attempted to shift towards the conscious competent state of development. However, by the end of the study as she was still in a state of insecurity, identifying aspects of the lesson which she regarded as in needed of development.

5.1.4 Summary of findings

The participants all showed development through exposure to the VSR study. They developed at different paces to one another and were observed in different states of development by the end of the study. Exposure to VSR had clearly allowed most of the teachers to gain a shift in perspective, which in turn resulted in these teachers showing development by the end of the study. Arguably, T3, who was absent for the first video-stimulated interviews, experienced the least amount of video-stimulation (T3) and showed the least amount of development. This could be due to the amount of exposure that he received from VSR. Based on the discussions above and in previous chapters, continuous use of VSR resulted in development of teachers. Beswick and Muir (2007) discussed that CPD needed to be continuous, otherwise it defeated the purpose of teacher development. This support the notion that T3's development in the study could have been stunted by his partial absence.

A trend of the data was that exposure to VSR had appeared to cause all participants to become seemingly more aware of their practice and conduct. Evidently, even teachers who avoid reflecting about themselves, can be influenced to reflect through the egocentric perspective, by being exposed to VSR. It was also evident, that as the study progressed and participants became more aware of their practices, their perspective of reflection appeared to shift towards the egocentric perspective. It was also noted that exposure to VSR seemingly caused teachers to shift from the unconscious incompetent state of development as they became more aware that their practice was not 'perfect.' This awareness pushed the teachers into the conscious incompetent state of development, where they were now aware that there were aspects of their teaching practice which required development. Çimer, Çimer and Vekli

(2013) described reflection as an activity which explores experiences and stated that it is a good practice to improve a teacher's practice and development. The findings showed that the teachers' development benefited from the study and that the reflective practice of VSR influenced the development of the participants.

5.1.5 Limitations

The study could possibly provide more data if the period of the data collection was longer or involved more cycles. This, however, was not due to insufficient data, but the researcher believes that the various teachers developed at different rates. A longer period of observation could have provided more data that showed even more development in teachers. This could be seen in the case of T2, where it appeared that T2 avoided reflection of his practices. There is a possibility that the length of period of the study might have been too short for T2 to begin developing. It is also possible that it stemmed from the fact that T2 was a veteran teacher, and veteran teachers are often resistant to changing their practices. The researcher, however, did not regret using T2 as a participant, as it provided data that indicated how a teacher such as T2 could develop.

An additional example is the case of T3 who was not present for the first cycle of interviews. This made it tricky to accurately observe T3's development as there were less observations to analyze. It would have been helpful if the period of the study was extended, to accommodate T3's absence, but this was not logistically possible at the time of the study.

Another limitation was the language factor at S2. The researcher found it challenging to translate Afrikaans transcriptions from T4, as certain words could have specific cultural/social meanings which could add to the meaning and intention of the quote. The researcher had to pay special attention to how the transcriptions were translated into English, to avoid losing potential meaning of the transcriptions.

For future studies, the researcher would place more focus on how the research questions should direct the interview process. Something that the researcher observed is that participants tended to veer away from the question at hand. Although the interviews raised valid, interesting points, the research questions (Main question and sub-questions) still needed to be answered. The interview could perhaps be structured in a manner in which there would be less digressions from the research question. In certain cases, participants responded

in a vague manner towards certain questions. This could have been due to a misunderstanding of the question or due to the individual's personal interest. The researcher acknowledged that he should possibly be more direct in future, regarding the content and nature of the question/s so that participants would be aware of what data was required from them.

It became complicated to acquire data from an individual who seemingly avoided reflection. Although this participant was not responding to the interviews as expected, the data added an interesting perspective to the research questions. The researcher had initially thought that this particular participant's avoidance of reflection was a waste of data but came to understand that the lack of reflection from this participant was an indication that there was a possible category of teachers, who lacked reflection in this manner. It is also of note that the participants often mentioned or focused on the macro-centric aspects of teaching. This study focused on the egocentric perspective of reflection, therefore in future, the researcher would structure the questionnaires and interviews to ensure that more data was provided to answer the research question.

5.2 Conclusions

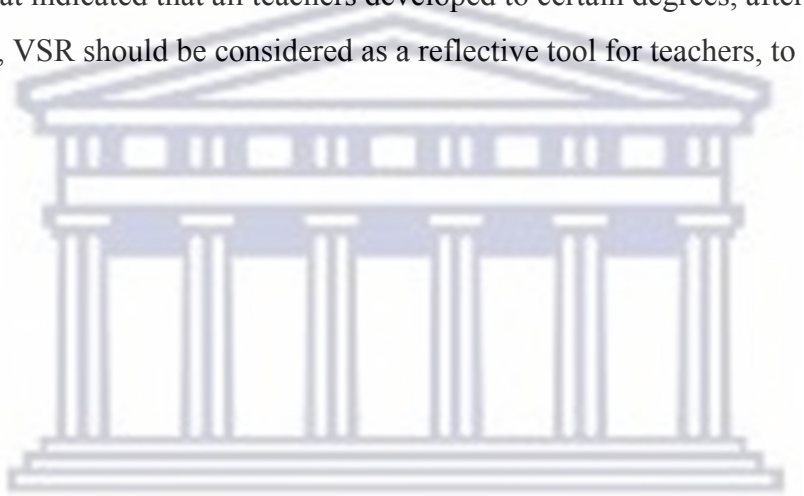
Gazdag, Nagy and Szivak (2019) argued that VSR can be used effectively for CPD and provides a safe environment for reflection and development of the teacher. This was clearly observed in how VSR influenced the participants' development. It was observed how the use of VSR influenced the teachers' awareness of their practices, as well as their perspective of reflection. The data showed that VSR influenced the teachers to reflect through the egocentric perspective, and created an awareness in the participants, which resulted in increased consciousness about issues that existed in their practice and lessons. All participants had developed through exposure to VSR, as a tool for reflection. Muir (2010) stated that VSR enhanced reflection, and this was evident in how all participants became more aware of themselves and their conduct through watching the video-recorded lessons and appeared more equipped to critically reflect on their lessons.

5.3 Recommendations

VSR is a useful tool incorporated in reflective practice, that can assist teachers in identifying areas of their practice which may need development. It assists the teacher in being able to view themselves from a different point of view, thus allowing them to see themselves as their learners see them. This is helpful in assisting teachers in noticing things which they

might not have noticed before. This process of reflection could result in teachers becoming more aware of their practices, resulting in them adopting an egocentric perspective. It became clear that VSR influenced development in the participants in a relatively short period of time. The promise of development meant that VSR could show success if used for CPD. This is echoed in the work of Beswick & Muir (2007) who argued that the continuous process of reflection allows for true CPD.

The results of this study were interpreted as suggesting that VSR is successful when used as a reflective tool to influence development in teachers. This was observed in the data that emerged, that indicated that all teachers developed to certain degrees, after exposure to VSR. Therefore, VSR should be considered as a reflective tool for teachers, to stimulate CPD.



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Appendices

Appendix A

Questionnaire: (pre-training) All Mathematics teachers who will be participating in training

What is your understanding of Continuous Professional Development (CPD)?

_____

_____

_____

Why do you think we have Continuous Professional Development (CPD)?

_____

_____

_____

What is your understanding of using reflection in your classroom?

_____

_____

_____

Do you currently use reflection on your classroom practice? Is yes, how often and in which form?

_____

_____

_____

How do you think reflection affects your teaching?

- Extremely unlikely
- Somewhat unlikely
- Neutral
- Somewhat likely
- Extremely likely

Does the introduction of a recording device/camera in the classroom make you nervous, or are you comfortable with it?

- Extremely nervous
- Somewhat nervous
- Neutral
- Somewhat comfortable
- Extremely comfortable

How interested are you towards using a recording device/camera in the classroom, or for preparing lessons?

- Extremely keen
- Somewhat interested
- Neutral
- Somewhat against
- Extremely against

Appendix B

VSR interview questions: Teachers whose lessons were recorded

1. **How, if any, did the introduction of VSR affect your awareness of your own teaching practice?**

2. **What were the different aspects of the lesson that you adapted/will adapt in future after you reflect through VSR?**

3. **Will you be continuing using VSR as a means of reflection? If yes, p**
4. **lease explain why you say so.**

5. **Has your perspective towards technology and reflection changed since implementing VSR?**

6. **Has your perspective towards CPD changed since training?**

7. **What factors contributes towards you continuing/not continuing reflection through VSR?**

8. **What is your perspective towards using VSR in the classroom, or for preparing lessons?**

- Extremely keen
- Somewhat interested
- Neutral
- Somewhat against
- Extremely against

Appendix C

UNIVERSITY *of the*
WESTERN CAPE

Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

Information Letter to principal/SGB

My name is Yasser Slamdien and I am a Masters of Education student from the University of the Western Cape (UWC). I am conducting research titled: Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall. The research is intended to investigate if and how teachers using reflection in their classrooms. The Western Cape Education Department (WCED) has approved ethical clearance for this research study.

Research plan and method:

In order to investigate CPD using reflection, I would like to do the following:

The Mathematics teachers at the school will be trained on how to use Video Stimulated Recall (VSR)in the classroom. VSR is a method of reflective practice where a lesson is video-recorded for the teacher to view at a later stage. This video footage assists the teacher in remembering what had occurred during the lesson and helps the teacher to understand why certain things occurred during the lesson. The teachers will be asked to complete a pre-training questionnaire on their understanding of reflection and VSR. Two Mathematics teachers will be asked to volunteer to be further involved in the study. These teachers will be approached for their lessons to be video-recorded with the aim to enhance reflection. No learners' faces will be included in the video footage, and if any appears, they will be blurred out to keep their identities anonymous. I would like to record a total of three lessons per volunteer. After a period of time, each volunteer will be shown their recorded lessons and an interview will be conducted between the volunteer and myself, the researcher. In this interview the teachers will be probed as to their perspective of reflection using VSR, and if exposure to VSR affected their awareness of their practices.

School involvement:

Once I have received your consent to approach learners to participate in the study, I will

- Obtain informed consent from learners in the classroom being recorded.
- Arrange for informed consent to be obtained from the parents of learners who will be in the specific classrooms being recorded.

Once permission is obtained from parents and learners, I will be

- Training the Mathematics educators in using VSR as a reflective tool.
- Select teachers will video-record three lessons in their classes.
- Select teachers will be interviewed by the researcher, where selected video-episodes will be discussed.

Thank you for taking the time to read this information. Please let me know if you require any further information. You can also contact the Humanities and Social Sciences Research Ethics Committee at 021 959 4111 or email research-ethics@uwc.ac.za if you have any concerns or complaints that have not been adequately addressed by me. I look forward to your response as soon as is convenient.

Yasser Slamdien (Researcher)
UWC
Tel: 072 3761 063
Email: yasserslamdien@gmail.com

Dr B. Nel (Supervisor)
UWC
Tel: 021 959 3796
Email: bnel@uwc.ac.za

Appendix D

Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

UNIVERSITY of the WESTERN CAPE

School Principal/SGB Consent Form

I give consent for you to approach our teachers and learners to participate in the study titled: "Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall."

I have read the Information Letter explaining the purpose of the research project and understand that:

- Training of the Mathematics team, interviews and questionnaires will form part of this study.
- The involvement of the school is voluntary
- We may decide to withdraw the school's participation at any time without penalty
- Learners in respective classes will be invited to participate and that permission will be sought from them and also from their parents.
- Only learners who consent and whose parents' consent will participate in the project
- All information obtained will be treated in strictest confidence.
- The school, teachers' and learners' names will not be used and their identities will not be identifiable in any written reports about the study.
- The learners' faces will be blurred out in any video footage.
- Participants may withdraw from the study at any time without penalty.

• A report of the findings will be made available to the school.

• I may seek further information on the study from Yasser Slamdien on 072 3761 063.

_____ _____

Principal Signature

_____ Date

Appendix E

Parents' Information Letter

Dear Parent

My name is Yasser Slamdien and I am a Masters of Education student from the University of the Western Cape (UWC). I am conducting research titled: "Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall". The research is intended to assist in the improved teaching of mathematics in schools in the Western Cape. The Western Cape Education Department (WCED) as well as the school principal has given approval for me to collect data at your child's school. My supervisor is Dr Benita Nel.

I, along with the class mathematics teacher, will be video recording mathematics lessons in the classroom. The purpose of video-recording the lesson is for the class teacher to be able to watch afterwards to observe their own teaching practice. The purpose of the video-recording will at no point be about the learner. Learners' voices may be part of the recording, and any learners' faces captured in the video will be blurred out for anonymity. The learners will not be identifiable in any footage or written reports about the study and all learners' identities will be completely anonymous. The data will be kept confidential as they will stay secured in a locked up cupboard in my office and on my password protected computer.

All research data will be destroyed within 5 years after completion of the project.

Participation in the study will not exceed 1 hour. The research activities will not interfere in any way with your child's schoolwork. Learners may decline to be in the classroom while the study is being conducted, at any time without penalty or any negative consequences. Those who choose not to be

in the classroom while the study is being conducted will be accommodated elsewhere under supervision.

If you grant your child permission to participate in this research, please complete and return the attached form.

Thank you for taking the time to read this information. Please let me know if you require any further information. You can also contact the Humanities and Social Sciences Research Ethics Committee at 021 959 4111 or email research-ethics@uwc.ac.za if you have any concerns or complaints that have not been adequately addressed by me. I look forward to your response as soon as is convenient.

Yasser Slamdien (Researcher)
UWC
Tel: 072 3761 063
Email: yasserslamdien@gmail.com

Dr B. Nel (Supervisor)
UWC
Tel: 021 959 3796
Email: bnel@uwc.ac.za

Appendix F

UNIVERSITY *of the*
WESTERN CAPE

Parent Consent Form

I……(**full names of parent**) hereby confirm that I received and understand the information letter as to the research study as well as the nature of the research project, and I assent/do not assent(**scratch out where applicable**) to my child

……. (**Full name of child**) participating in the research project.

I understand that my child is at liberty to withdraw from the project at any time without any negative consequences, should I/he/she so desire.

SIGNATURE OF PARENT DATE

……

Appendix G

UNIVERSITY of the
WESTERN CAPE

PARTICIPANT INFORMATION LEAFLET AND ASSENT FORM

TITLE OF THE RESEARCH STUDY: Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

RESEARCHER'S NAME: Yasser Slamdien

ADDRESS:

What is RESEARCH?

Research is something we do to find new knowledge about the way things (and people) work. We use research projects or studies to help us find out more about topics or easier ways to do things. Research also helps us to find better ways of helping, or teaching children in schools.

What is this research study all about?

This study will be focused on your mathematics teacher. I, and your teacher will be video-recording lessons during your mathematics class. The purpose of the video-recording is not to watch/observe you, but to observe your teacher!

Why have I been invited to take part in this research study?

I will need to record a Mathematics teacher while they are teaching a mathematics class, and you will be in class!

Who is doing the research?

I will be doing the research. During the time that I will be running the project, I would like you to see me only as a researcher and NOT a teacher! All video-recordings done for this study will not affect your schoolwork in any way. The activities are also not for marks. Sound like fun?

What will happen to me in this study?

Nothing! You will carry on with your lesson as usual. The video-recording will be focussing on your teacher while they teach you.

Can anything bad happen to me?

Absolutely nothing bad can happen to you. If your face appears in the video footage, it will be blurred out. NOTHING of this will be for marks! If you feel uncomfortable in any way, you may pull out of the study at any time.

Can anything good happen to me?

Your involvement in this project might help many teachers to be able to help you learn even better. Doesn't it feel good to contribute positively towards society? ☺

Will anyone know I am in the study?

Absolutely nobody will know that you took part in this study. Unlike the school, your name will not be on anything.

Who can I talk to about the study?

You may speak directly to me!

What if I do not want to do this?

If you are not interested in taking part in this study, that is absolutely fine! Nothing will happen to you at school or in class. It will not affect your marks or reports in any way. Just simply tick 'no' in the box below.

Do you understand this research study and are you willing to take part in it?

YES	NO

Do you understand that you can pull out of the study at any time?

YES	NO

_____ _____

Signature of Child Date

Appendix H

Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

UNIVERSITY *of the*
WESTERN CAPE

Information Letter - Teachers

My name is Yasser Slamdien and I am a Masters of Education student from the University of the Western Cape (UWC). I am conducting research titled: "Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall". The research is intended to investigate if and how teachers using reflection in their classrooms. The Western Cape Education Department (WCED) has approved ethical clearance for this research study.

Research plan and method:

In order to investigate continuous professional development using reflection, I would like to do the following:

The Mathematics teachers at the school will be trained on how to use Video Stimulated Recall (VSR) in the classroom. VSR is a method of reflective practice where a lesson is video-recorded for the teacher to view at a later stage. This video footage assists the teacher in remembering what had occurred during the lesson and helps the teacher to understand why certain things occurred during the lesson. The teachers will be asked to complete a pre-training questionnaire on their understanding of reflection and VSR. Two Mathematics teachers will be asked to volunteer to be further involved in the study. These teachers will be approached for their lessons to be video-recorded with the aim to enhance reflection. No learners' faces will be included in the video footage, and if any appears, they will be blurred out to keep their identities anonymous. I would like to record

a total of three lessons per volunteer. After a period of time, each volunteer will be shown their recorded lessons and an interview will be conducted between the volunteer and myself, the researcher. In this interview the teachers will be probed as to their perspective of reflection using VSR, and if exposure to VSR affected their awareness of their practices.

Teacher involvement:

- Teachers will complete a questionnaire based on their understanding and views of reflection.
- Teachers will be trained to use VSR in their classrooms
- Each teacher will record three Mathematics lessons in their classrooms over a period of at least two weeks.
- After a period of at least two weeks, teachers will meet with the researcher for an interview, where a video-episode will be viewed and discussed.
- The video-recording/interview cycle will occur twice.

Thank you for taking the time to read this information. Please let me know if you require any further information. You can also contact the Humanities and Social Sciences Research Ethics Committee at 021 959 4111 or email research-ethics@uwc.ac.za if you have any concerns or complaints that have not been adequately addressed by me. I look forward to your response as soon as is convenient.

Yasser Slamdien (Researcher)

UWC

Tel: 072 3761 063

Email: yasserslamdien@gmail.com

Dr B. Nel (Supervisor)

UWC

Tel: 021 959 3796

Email: bnel@uwc.ac.za

Appendix I

Exploring shifts in Teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

UNIVERSITY *of the*
WESTERN CAPE

School Teacher Consent Form

I have read the Project Information Letter explaining the purpose of the research project and I give consent to participate in the:

	Circle one please
• Training of the Mathematics team	YES/NO
• Being interviewed and audio-recorded	YES/NO
• Completing questionnaires.	YES/NO
• Video-stimulated recall where my lessons will be video recorded	YES/NO

I may seek further information on the study from Yasser Slamdien on 072 3761 063.

_____ _____

Teacher Signature

_____

Date

Appendix J

UNIVERSITY of the
WESTERN CAPE

Learner Assent Form

I……(**full names of learner**) hereby confirm that I received and understand the information letter as to the research study as well as the nature of the research project.

Do you understand this research study and are you willing to take part in it?

YES	NO

Do you understand that you can pull out of the study at any time?

YES	NO

_____ _____

Signature of Child Date

Appendix K

Turnitin Report

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	YASSER Slamdien
Assignment title:	Turn It In report MEd 2023
Submission title:	3102256:Inline_Submission
File name:	6c0-382a-4bf5-89bf-cdbd2a588ec7_3102256_2023-01-16_15-...
File size:	422.6K
Page count:	51
Word count:	37,430
Character count:	190,129
Submission date:	16-Jan-2023 03:40PM (UTC+0200)
Submission ID:	1993578727

Appendix L

Language editor letter

Editing certificate

Creative Communication
Carol C Ashley BA (Hons) MMSc MPhil PhD
76 Queen Victoria Street
Cape Town 8001 27 662857507

creativecommunication@mail.com
https://www.linkedin.com/in/carol-charmaine-edson-

16 January 2023

RE: EDITING OF THESIS – Y SLAMDIEN

Exploring shifts in teachers' perspectives of reflection in a context of CPD using Video-Stimulated Recall

Student Number: **3102256**

Supervisor: Dr BP Nel

Masters in Education

This serves to confirm that the above-named document has gone through the process of copy-editing, and technical editing for clarity, coherence, punctuation, revision etc. Neither factual content or authorial intention have been disrupted during editing.

The editor is suitably qualified and experienced, and holds a Masters Degree in Psycholinguistics.

Best regards

CA
Dr Carol C Ashley

Academic Author/Developer/ Editor/ Linguist: On Editorial Board: Science PublishingGroup

Appendix M

Ethics Approval letter from institution

UNIVERSITY *of the* WESTERN CAPE

22 April 2021

Mr Y Slamdien
Institute for Post School Studies
Faculty of Education

HSSREC Reference Number:	HS21/2/19
Project Title:	Exploring shifts in teachers' perspectives of reflection in a continuous professional development context using video-stimulated recall.
Approval Period:	20 April 2021 – 20 April 2024

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report by 30 November each year for the duration of the project.

The permission to conduct the study must be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse events and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

NHREC Registration Number: HSSREC-130416-049

Appendix N

Appendix N

Ethics approval letter from WCED

Directorate: Research

Audrey.Wyngaard@westerncape.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 202103011-1555
ENQUIRIES: Dr A T Wyngaard

Mr Yasser Slamdien
29 Mathew Road
Harfield Village
7708

Dear Mr Yasser Slamdien

RESEARCH PROPOSAL: EXPLORING SHIFTS IN TEACHERS' PERSPECTIVES OF REFLECTION IN A CONTEXT OF CPD USING VIDEO-STIMULATED RECALL

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **26 April 2021 till 30 September 2022.**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number.
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

    The Director: Research Services
    Western Cape Education Department
    Private Bag X9114
    CAPE TOWN
    8000

We wish you success in your research.

Kind regards.
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 12 March 2021