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**The role of structured play in facilitating preschool  
learners' executive functions**

**by**

**Elsa Marilise de Carvalho Etokabeka**

Submitted in partial fulfilment of the requirements for the degree

**PHILOSOPHIAE DOCTOR  
in the Faculty of Education**

**at the**

**UNIVERSITY OF PRETORIA**

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**OCTOBER 2021**

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I, Elsa Etokabeka, student number 10072022, hereby declare that this thesis, **The role of structured play in facilitating preschool learners' executive functions**, is submitted in accordance with the requirements for the degree PhD. General at the University of Pretoria, is my own original work and has not previously been submitted by me for a degree at this or any other tertiary institution. All sources cited or quoted in this research paper are indicated and acknowledged with a comprehensive list of references.



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**DEGREE AND PROJECT**

PhD

The role of structured play in facilitating  
preschool learners' executive functions

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27 November 2019

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## ABSTRACT

Being part of the early childhood development and education community, my study could contribute to the communal effort to address how South African learners are prepared and readied for informal and formal schooling.

Executive function encompasses important cognitive and behavioural skills that enable students to plan, self-regulate and work flexibly within a learning environment. Executive function is a prerequisite for learning and school readiness - it permits learning and adjustment in formal school; it is therefore important that it should be strengthened during the early years.

Using a case study design, enables me to explore the role of structured play in facilitating the development of executive function in preschool learners. The data generating techniques included conducting semi-structured interviews, observing lessons, analysing lesson plan documents, taking photographs, as well as keeping field notes. Eight preschool teachers were interviewed and observed. The participants' responses served the purposes of the study to understand the roles, teaching techniques and learning materials that facilitate executive function through structured play. It further provided information on how to incorporate structured play games in alignment with the national preschool curriculum (National Curriculum Framework) to support executive function skills. The study revealed a number of creative learning opportunities that are fun, hands-on and engaging, that can be used to improve preschool learners' academic performance.

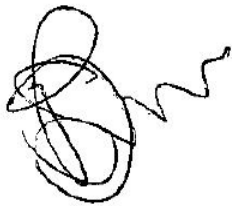
The key findings confirm that specific teaching techniques and resources enhance executive function during learning experiences. Furthermore, the role of the teacher guides preschool learners to acquire executive function skills during structured play. The implication of the study is that executive function can only be strengthened and sustained if educators are knowledgeable of the skill, and can apply various techniques to support its development.

### **Key terms**

Children, Executive function; Grade RR; Planned lessons; Play-based pedagogy; Preschool; Structured play

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Dr Sonja Brink

## DEDICATION

I dedicate this research to my parents Desire and Eunice.



Photo: EtoKabeka, 2021.



## ACKNOWLEDGEMENTS

To have achieved this milestone in my life, I would like to express my sincere gratitude to the following people:

- I would like to thank the Lord who facilitated the stepping stones towards completing this work. Thank you for giving me life, wisdom and strength to complete this journey. I started with a B.Ed degree not having much of a direction but just to think how you've multiplied that small seed to what I have now amazed me. It's much more than I could have ever asked for.
- To my wonderful parents, your prayers and love have been your greatest gift in this lifetime. I thank you for inspiring me to come this far. I am truly blessed to have completed this degree in your honour.
- To the University of Pretoria, the resources, as well as facilities, made this journey possible. Without your investment in higher education, I would not have acquired various skills I've obtained over the years. From getting my B.Ed. degree to now receiving my PhD, I am honoured to reach a full circle with the institution I started with. Thank you for granting me many opportunities to work, as well as learn.
- My supervisors Drs van Heerden and du Preez. Dr van Heerden thank you for taking me under your wing and dedicating your time to help me complete this degree. Your leadership and kindness helped produce one of my best works. Dr du Preez, your critical and creative eye helped me further explore the depth of my topic. You equipped me with the necessary skills to produce the final product. I am eternally grateful for being led by two strong women and hope to pass this same banner onto others.
- I would like to thank the schools that allowed me to collect the necessary data. In very trying times such as the COVID-19 pandemic, you opened your doors and enabled me to learn from your environment. This study would not have been possible if it weren't for you.
- The participating teachers. Thank you for being part of this story and sharing your experiences with me. I learnt a lot from every one of you in unique ways. Your passion and dedication to serving the children of this country is truly inspiring and



I hope to make you proud with the outcome of my work. The learning and teaching experiences made this study worth conducting.

- My friends and family members who kept cheering me on. You paved the way to achieve this milestone. I would also like to thank my donors, as well as supporters for assisting me in most valuable times. Laura and Cynthia, my undeniable pillars of strength. I have an amazing support structure because you made it possible to do the things I do. Thank you from the bottom of my heart for being there every step of the way. Not forgetting Renicia, you are the unit that completes us.
- I would like to thank my colleagues whose thesis and dissertations I learnt from. My peers, thank you for advising me as well as sharing the knowledge that you have; it all contributed towards completing this degree.
- To my language and technical editor, Dr Sonja Brink. I sincerely would like to thank you for your guidance and extra push. The time, patience and effort taken to refine my work; I am truly grateful for your feedback and recommendations. I value even more this final outcome.
- Lastly, this publication was produced with support from the Teaching and Learning Development Capacity Improvement Programme, a partnership programme between the Department of Higher Education and Training and the European Union. Its contents are the sole responsibility of the researcher and do not necessarily reflect the views of the Department or the European Union.

## ABBREVIATIONS AND ACRONYMS

CHAT	Cultural Historical Activity Theory
CPTD	Continuing Professional Teacher Development
CSR	Chicago School Readiness Project
DBE	Department of Basic Education
DSD	Department of Social Development
ECCE	Early Childhood Care Education
ECD	Early Childhood Development
ECE	Early Childhood Education
ECEC	Early Childhood Education and Care
ECEF	Early Childhood Education Framework
EF	Executive function
ELDA	Early Learning Development Areas
ISASA	Independent Schools Association of Southern Africa
ITE	Initial teacher education
KITS	Kids in Transition to School
LTMS	Learning Teaching Materials in School
MRPLQHEECDE	Minimum Requirements for Programmes Leading to Qualifications in Higher Education for Early Childhood Development Educators
NaCCA	National Council for Curriculum and Assessment (Ghana)
NACECE	National Centre for Early Childhood Education (Kenya)
NCF	National Curriculum Framework
NEL	Nurturing Early Learners
NELDS	National Early Learning Development Standards
NDCP	National Day-care Centre Policy
NGO	Non-Government Organisations
PATHS	Promoting Alternative Thinking Strategies
RNPE	Revised National Policy on Education
UNESCO	United Nations Educational Scientific and Cultural Organization
ZPD	Zone of Proximal Development

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# CHAPTER 1:

## INTRODUCTION AND BACKGROUND TO THE STUDY

### 1.1 INTRODUCTION

This chapter introduces the research topic; to investigate the role of structured play in facilitating preschool learners' executive functions. Executive function can be understood as a cognitive ability that regulates the thoughts and actions needed to complete a task (Diamond, 2013; Serpell & Espesito, 2016:204). In other words, executive function refers to those skills that help people plan and arrange themselves to effectively attain an objective. Executive function, according to Russell (2015:2), is necessary for everyday functioning – including learning – as it helps learners to obey rules, focus on a task, ignore distractions and develop alternatives when facing challenges. The skill ultimately enables learners to attain academic success by working effectively, as well as engaging respectfully in class (Ackerman & Friedman-Kraus, 2017:3; McClelland & Cameron, 2019:143; Shaul & Schwartz, 2014:753).

Literature on the topic states that one of the ways that executive function can be developed is through social engagement because activities such as play and adult interactions facilitate components of executive function such as attention, cognitive flexibility and memory (Duval, Bouchard, Page & Hamel, 2016; Dias & Seabra, 2017; Qu, 2011; Russell, 2015). Structured play has been noted to stimulate executive function skills as the various components of executive function (memory, attention, the inhibitory control and cognitive flexibility) were found to be active during structured play activities (Medina & Sobel, 2019:2; Diamond, Burnett, Thomas & Munro, 2007:318). Structured play, according to Weisberg, Hirsh-Pasek, Golinkoff, Kittredge and Klahr (2016:178), can be understood as play activities that require guidance and instructions for completion. During structured play, the participants normally have to follow instructions in order to attain an overall outcome (Weisberg, Hirsh-Pasek & Golinkoff, 2013:105).

It is worth noting that the topic executive function has been extensively explored in various countries (Kelkar, Hough & Fang, 2013; Legare, Dale, Kim & Deak, 2018; Sabbagh, Xu, Carlson, Moses & Lee, 2006). Some of the prominent voices in the field include Diamond (2013), The Center on the Developing Child at Harvard University

(2016), as well as Blair (2016). Such research has contributed to a better understanding of executive function in the learning environment, and of how children apply the skill outside the learning context. One of the reasons why executive function is often explored in research is because it is an important skill, which helps learners overcome cognitive, behavioural and academic challenges (Halperin, Marks, Bedard, Chacko, Curchack, Yoon & Healey, 2012; Marlowe, 2000; O'Neill, Rajendran & Halperin, 2012). Research on executive function in the South African context mostly focuses on older age groups that include adolescents and tertiary students (Britz & van Zyl, 2020; de Jager & Condy, 2017; Petousis, 2008). Thus, the available knowledge on the subject could be broadened by exploring how teaching practices can enhance the development of executive function of young children within the South African preschool context (Cook, 2019; Cook, Howard, Scerif, Twine, Kahn, Norris & Draper, 2019; Fitzpatrick, 2014; Legare et al., 2018). With this study, it is important to explore how teachers' use explicit strategies and resources through structured play to promote the development of executive function in classroom practices by listening to their personal experiences.

The authors Diamond (2013), as well as Barker and Munakata (2015), reveal that poor executive function results in learners struggling to prioritise, complete a task or overcome a challenge. It is therefore very important that this skill is developed as it helps children adjust in the learning environment (Barker & Munakata, 2015; Diamond & Lee, 2011). The works of Serpell and Esposito (2016); Walk, Evers, Quante and Hille (2018); Fleer, Veresov, Harrison and Walker (2017); Russell (2015); as well as Dias and Seabra (2017) discuss how teachers are guided to develop executive function in preschool learners. These works exemplify the means to prepare the learning experience, scaffold preschool learners during tasks, as well as observe how children engage to use executive function effectively. Etokabeka (2018) found that, although teachers are cognisant of teaching executive function skills in South Africa, they require an explanation of the term (Etokabeka, 2018). A reason for this might be because educators lack exposure to literature about the importance of executive function - teachers often understand the meaning of executive function after an explanation has been provided (Etokabeka, 2018).

## **1.2 RATIONALE**

Every year, in South Africa, children complete preschool to commence formal schooling (Bruwer, Hartell & Steyn, 2014:19). This transition can be particularly difficult for children who lack the necessary skills to function in formal schooling (Fitzpatrick, 2014:157). Research by Sasser, Beekman and Bierman (2015:681) and Fitzpatrick (2014:157) show that children who enrol for Grade 1 often start school with inadequate cognitive and self-regulation skills. These children are prone to experience learning problems that affect their academic performance, as well as their social interaction with their peers and others (Fitzpatrick, 2014:157; Holmes, Kim-Spoon & Deater-Deckard, 2015:32; Roberts & Venkat, 2015:1). Anderson (2002:71) further states that without the necessary executive function skills, children face challenges such as repeating a grade or battling to cope in class (struggling to remember key information and complete necessary tasks). Effective learning is one of the reasons why early childhood education research has signalled the need to develop executive function during early years (Blair, 2016:102; Fitzpatrick, 2014:160). Having executive function, according to Rothlisberger, Neuenschwander, Cimeli, and Roebbers (2013:153), means to attain school readiness and academic success and therefore, teachers ought to take measures that facilitate the skills set in children.

Play has been found to develop the structure of the brain and a proper brain structure enhances executive function in children (Yogman, Garner, Hutchinson, Hirsh-Pasek & Golinkoff, 2018:2). This is because play stimulates the cognitive, social, emotional and physical development of a child (Fleer, Veresov & Walker, 2017:2). For example, Fleer et al., (2017:2) found that many preschool curricula strongly encourage play-based pedagogy (an organized style of teaching and learning through play) because it promotes the acquisition of 21st-century skills. These skills include creativity, problem-solving and group collaboration which encapsulate what executive function does in the learning environment; executive function teaches problem-solving, collaborating and adjusting to different learning contexts. Thus, play serves an important role in enhancing executive function (Fleer et al., 2017:2).

### **1.2.1 Contextual Background**

South African studies based on school readiness found that most children who commence formal schooling lack the basic skills needed to effectively adapt to the learning environment – this includes the ability to follow instructions, work

autonomously, or focus on a task at hand (Bruwer et al., 2014:19; Fitzpatrick, 2014:160; Van Rensburg, 2015:3).

Shaul and Schwartz (2014:751), as well as van Rensburg (2015:2), affirm that preschools should function with the purpose of ensuring that children's' right to education are met by equipping them with the fundamental skills needed for formal learning. At the moment, there are two forms of preschool structures in South Africa - the ones regulated by the government as an extension of the primary school under the National Curriculum framework (NCF) and independent preschools managed by Independent Schools Association of Southern Africa (ISASA) (Department of Basic Education [DBE], 2009:2). Both government and independent preschools are encouraged by the National Early Learning and Development Standard (NELDS) to follow approaches that focus on child development and play pedagogy (DBE, 2009). This means that the South African curriculum focuses on play as a modality which enables children to attain the necessary knowledge and skills to prepare them for formal schooling (DBE, 2015:60; ISASA, 2015:117; Republic of South Africa, 2015:61). Similarly, the Policy on Minimum Requirements for Programmes Leading to Qualifications in Higher Education for Early Childhood Development Educators (Department of Higher Education and Training, 2017:18) states that preschool teachers should have an informed understanding of, and adequate training in, teaching through play – particularly for children aged three to five years. Thus, preschool teachers require the necessary skills to apply a play pedagogy to facilitate the implementation of executive function.

Currently, South Africa's early childhood development programme follows the NCF, as well as the NELDS for children from birth to four years old. It is worth noting that neither of these programmes are compulsory; they nevertheless act as guidelines for educators to enable preschool learners to attain emotional, physical, cognitive and social development (DBE, 2009:57; Republic of South Africa, 2015:8). Interestingly, neither the NCF nor NELDS specify how executive function skills can be facilitated through structured play within the early childhood education programme; hence, this study hopes to address this gap.

### **1.2.2 Problem statement**

Although the DBE (2009:8) provides guidelines for teachers to implement a play-based pedagogy; I have noticed that the curriculum does not state how play-based teaching

techniques can and should facilitate executive function. Ackerman and Friedman-Krauss (2017:9) note that there are “aims to improve preschoolers’ and kindergartners’ executive functions through intentional teaching and different classroom strategies. These include children’s formulation of play, as well as lesson designed to help the learners monitor themselves and evaluate their performance”. With this in mind, it has become increasingly important to see how the development of executive function is facilitated in preschools, and how learning experiences are planned to accommodate structured play (Slot, Mulder, Verhagen & Leseman, 2017; Qu, 2011; Zyga, 2016). Despite research by de Jager and Condy (2017), Britz and van Zyl (2020), and Petousis (2008) on executive function in the South African context, there still exists a gap in the literature as to how executive function is facilitated in preschools. This is because some of the research done mostly focused on older learners or children who are past their preschool years. Furthermore, there is not sufficient guidance in literature to promote teachers to develop executive function through structured play in the context of South African preschools (Cook, 2019; Russell, 2015; Xiong, Li & Tao, 2017).

### **1.2.3 Academic rationale**

Reports on disruptive behaviour in South African schools have increased (Marais & Meier, 2010:41). Preschool learners with externalising behavioural problems, such as aggression, impulsivity and rule-breaking often make it difficult for teachers to teach effectively. This is because the time spent on attending to externalising behavioural problems distract other children from the work at hand, thereby disrupting the learning experience of the whole class (Marais & Meier, 2010:43). Sulik, Blair, Mills-Koonce, Berry, Greenberg, and Family Life Project Investigators (2015:2) uphold that “strong executive function can be used to support the regulation of externalising behaviour or negative emotions...such as anger”. By developing executive function through structured play, behavioural problems can be minimised to ensure children commence formal school with the necessary self-regulatory skills (Sulik et al., 2015:3).

Apart from disruptive behaviour, children who have poor executive function also struggle to remain attentive (Sasser, Beekman & Bierman, 2015:682). Children with poor executive function are easily distracted from the task at hand, as they are prone to either doze off or fiddle with items during lessons (Marais & Meier, 2010:50). When children become less engaged or uninterested (bored), it hampers their learning,

ultimately leading to low academic performance (Kotzé, 2015:4). Thus, by implementing play to develop executive function, preschool learners can be helped to attain the necessary skills to learn effectively. Since play and executive function facilitate learning and the comprehension of various topics; play and executive function can help improve preschool learners' academic performance.

Miller and Almon (2009:4) have found that many preschool teachers who apply play-based pedagogy, struggle to balance child-initiated play and teacher-directed lessons. This is because teacher-directed lessons are not always effective in implementing play pedagogy (Miler & Almon, 2009). Yogman et al., (2018) found that preschool lessons are often rigidly organised, which deprives children of playing or exploring content on their own. According to the DBE (2015:2) and educational theorists such as Fleer (2013:18) and Wood (2013:24), learning experiences ought to be designed to encompass stimulating and creative techniques that capture and retain children's attention, and that guide their social and learning behaviour through developmentally appropriate play-based pedagogy. It is therefore important that preschool teachers guard against following rigid teaching practices that focus on attaining academic skills, as these do not support the learning advocated by the NCF for children aged birth to four years, which includes the freedom to explore, engage and experience (DBE, 2015:57).

Literature describes structured play as an aspect of learning that could significantly contribute to facilitating executive function skills (Kok, Kong & Bernard-Opitz, 2002; Murata & Maeda, 2002; Weisberg et al., 2013; Weisberg et al., 2016). This is because structured play strengthens the knowledge and development of executive function (Weisberg et al., 2013; Weisberg et al., 2016). The components of executive function, such as inhibitory control and attention allow preschool learners to be motivated, focused, and persist in tasks to complete their work effectively (Rosas, Espinozas, Porflitt & Ceric, 2019). In the same vein, the work of Nicolopoulou (2010:4) reiterates a "need (for) more play-oriented research that systematically analyses the effects and outcomes of different preschool curriculum practices, play-based and otherwise, for children's learning and development". By exploring how teachers implement structured play to develop cognitive and behavioural skills, the study notes how these techniques can be used to facilitate executive function.

## **1.3 RESEARCH QUESTIONS**

### **1.3.1 Primary question**

The primary research question guiding this study was formulated as follows:

*How can preschool teachers facilitate executive function through structured play?*

### **1.3.2 Secondary questions**

The secondary research questions, supporting the primary question for this study were formulated as follows:

- Which teaching techniques do teachers utilise when facilitating executive function through structured play?
- What are preschool teachers' roles when facilitating executive function through structured play?
- What resources are utilised to facilitate executive function through structured play?
- What challenges and benefits do preschool teachers experience when facilitating executive function through structured play?

## **1.4 CONCEPT CLARIFICATION**

The terms which are used in this research report, as well as their definitions, are clarified in Table 1.1.



Table 1.1: Clarification of concepts

CONCEPT	CLARIFICATION	LITERATURE
<b>Children</b>	Babies, toddlers and infants irrespective of their strengths, sex, background, values or language spoken. Children require care and looking after by an older person. In the context of this study, it is worth noting that the word 'children' also refers to preschool learners.	<ul style="list-style-type: none"> <li>• DBE (2015:ii).</li> </ul>
<b>Executive function</b>	<p>Executive function can be understood as cognitive and behavioural skills that enable individuals to achieve a task.</p> <p>Executive function mainly encompasses self-regulation, working memory and cognitive flexibility; working interchangeably in the operation of fulfilling a goal. They enable people to plan, direct, manoeuvre and execute a task.</p>	<ul style="list-style-type: none"> <li>• Blair (2016:102);</li> <li>• Diamond (2013:135);</li> <li>• Fitzpatrick (2014:159);</li> <li>• Levine and Munsch (2016:396);</li> <li>• Schoemaker, Deković, and Matthys (2012:457).</li> </ul>
<b>Grade RR</b>	As children admitted to Grade R usually turn five in that year, children in Grade RR turn four years old. The age group and classroom observed in this study consist of Grade RR. In the context of the South African learning environment, preschools consist of three classes that include Grade RRR (children aged three years), Grade RR (children aged four years) and Grade R (children aged five years) – also considered as kindergarten children.	<ul style="list-style-type: none"> <li>• Department of Basic Education, (2019).</li> </ul>
<b>Planned lesson</b>	A selection or sequential arrangement of learning and teaching experiences. Its structure informs us of the content, stages and methodology to achieve the learning outcome.	<ul style="list-style-type: none"> <li>• Dorovolomo, Phan, and Maebuta (2010:448);</li> <li>• Musingafi, Mhute, Zebron, and Kaseke (2015:54).</li> </ul>
<b>Play-based pedagogy</b>	Play-based pedagogy is a method or didactic approach that utilises play to achieve the objective of the learning experience. The teaching techniques comprise playful activities that are child-centred, often applied in early childhood education. An adult or more knowledgeable person, for example, oversees and guides children to attain predetermined learning objectives	<ul style="list-style-type: none"> <li>• Bodrova and Leong (2011:64);</li> <li>• Daubert, Ramani, and Rubin, (2018);</li> <li>• Pyle and Danniels (2017:276);</li> </ul>

CONCEPT	CLARIFICATION	LITERATURE
		<ul style="list-style-type: none"> <li>• Samuelsson and Carlsson (2008:623).</li> </ul>
<b>Preschool</b>	<p>In South Africa, 'preschool' indicates an early childhood learning centre that instils learning in young children through play pedagogy. In the context of this study, the children are aged 3 to five years. Centres are led by professionally trained teachers who are qualified to teach early childhood education to preschool learners. The learning that occurs therein supports the transition period before the child commences with formal schooling.</p>	<ul style="list-style-type: none"> <li>• DBE (2015:35);</li> <li>• Public Broadcasting Service (2019);</li> <li>• Van Heerden (2012:XV).</li> </ul>
<b>Structured play</b>	<p>A form of play that works towards attaining distinctive objectives. The teachers provide instructional steps to assist children to attain knowledge as well as skills. Aspects such as cognitive, behavioural and socio-emotional skills mature as structured play enables children the opportunity to familiarise, implement and rehearse a skill; this with the guidance and support of a more knowledgeable person.</p>	<ul style="list-style-type: none"> <li>• Burdette and Whitaker (2005);</li> <li>• Murata and Maeda, (2002:237);</li> <li>• Yogman et al. (2018:7).</li> </ul>

### **1.4.1 Interchangeable terms**

Within research, conveying ideas is important (Hunt, 2007:4). With a wide variety of terms to choose from, it is understandable to see why researchers seek unique terms to explain their thoughts. Literature on any topic often contains terms that are synonymous and that, as a result, can be used interchangeably. The problem with this, however, is that very few terms can properly explain an idea without invoking different meanings (Barkley, 2012:4; Blair, 2016:102; Diamond, 2013:1-2; Fitzpatrick, 2014:159). Thus, it is vital to understand different terms that exist, what makes them synonymous with each other and how they can be distinguished from each other.

Table 1.2 shows the concepts used in this study, together with some of the alternative terms used in literature. The table also clarifies terms that are synonymous with specific words and gives my reason for selecting a particular term.

Table 1.2: Interchangeable terms

CONCEPT	SYNONYM 1	SYNONYM 2
<b>Early Childhood Education (ECE)</b>	<b>Early Childhood Care Education (ECCE)</b> Early Childhood Care and Education can be understood as a learning body that caters to the development and care of children aged birth to three years. These centres look after children and work to ensure that they attain the necessary primary skills of learning. The term ECCE is often used in countries such as Singapore. Its focus centres on the training of educators to provide the necessary care to children. Thus, teachers are taught how to look after and develop the necessary skills of toddlers (UNESCO, 2019).	<b>Early Childhood Education and Care (ECEC)</b> Early Childhood Education and Care is also a learning body that caters to the development and looking after children within preschool years. Children in ECEC are slightly older as their ages range from birth to the age of five years. The term ECEC is commonly used in the West, such as in Canada and European countries. Its focus centres on providing necessary knowledge and skills for formal schooling (OECD, 2018).
<b>Executive function</b>	<b>Self-regulation</b> Self-regulation covers similar traits as executive function. It is however, distinct from executive function in the sense that it mainly centres on behavioural skills – the ability to control and regulate actions and thoughts to achieve a goal. Furthermore, self-regulation is just one of the various skills of executive function (Hoffman, Schmeichel & Baddeley, 2012:174).	<b>Metacognition</b> Metacognition involves the process of (self) examining how one thinks. In examining how one thinks, metacognition monitors, controls, as well as plans actions so that people are able to apply the necessary action in completing a task. Metacognition similarly relates to executive function in that they both deal with cognitive abilities; however, metacognition is unique in the sense that it mostly centres on thought processes, whereas executive function deals with both thought and behavioural processes (Roebbers, 2017:31).

CONCEPT	SYNONYM 1	SYNONYM 2
<b>Planned lessons</b>	<p><b>Lesson plan</b></p> <p>A lesson plan is a schema (outlined on paper) used to guide teachers in executing lessons. They act as evidence to demonstrate the steps and ideas that the teacher implements towards achieving the outcomes of a lesson. Lesson plans can be used for both structured and unstructured lessons (Nagro, Fraser &amp; Hooks, 2018:137).</p>	<p><b>Guided lesson</b></p> <p>Guided lessons indicate the collaboration between teachers and learners. After presenting the learning content, the teacher proceeds to rehearse with learners by interacting in a similar activity, to further complete the task on their own during the lesson (Lucenario, Yangco, Punzalan &amp; Espinosa, 2016:3).</p>
<b>Play-based pedagogy</b>	<p><b>Play-based learning</b></p> <p>The ability to explore, discover, and develop meanings. In adopting play-based learning, teachers can then strengthen concepts as well as enable preschool learners to become acquainted with what they want them to learn. Play-based learning permit children to acquire vital skills such as social skills, numeracy and literacy - all needed for their development. Consequently, play-based learning consists of learning opportunities as opposed to methods and learning techniques (Fesseha &amp; Pyle, 2016:361).</p>	<p><b>Play-based activities</b></p> <p>Consist of activities that allow children to experience concepts/knowledge through play. Examples include playing with toys, constructing/building items and playing outdoors. Play-based activities enable children to make use of various senses. Thus, play-based activities are applied within both play-based pedagogies and play-based learning (Willis &amp; Walters, 2014:288).</p>
<b>Preschool</b>	<p><b>Nursery school</b></p> <p>Nursery schools cater for infants of the age of three months to three years. Nursery schools both teach and assist children who require help in helping themselves. As nursery children struggle to perform basic tasks, teachers therein assist with eating, potty training, as well as picking up after the child (Dombkowski, 2010:533).</p>	<p><b>Grade R</b></p> <p>Considered to be the introductory year in South Africa, Grade R acts as an introduction to formal schooling. The grade encompasses informal learning where learning experiences often include play. Children who attend Grade R are aged five to six years; the children are older than those who attend preschool or nursery school. The subjects covered in preschool include mathematics, literacy, life skills and arts - similar to subjects found in formal schools (Van Heerden, 2012:XV).</p>

CONCEPT	SYNONYM 1	SYNONYM 2
<b>Structured play</b>	<p><b>Guided play</b></p> <p>This technique permits children to discover an environment set up by adults. Similar to free play, it consists of active engagement that is enjoyable, voluntary and adaptable. Adult support is highly necessary to achieve the learning objectives. Guided play is similar to structured play in that they both comprise adult supervision; however, they differ as guided play applies free play (Weisberg, Hirsh-Pasek &amp; Golinkoff, 2013:104).</p>	<p><b>Constructive play</b></p> <p>Constructive play involves operating and handling items/toys to produce other items. Children get to experiment working with different objects so they can identify the most suitable tool to achieve the outcome. Examples include building cars, sandcastles and houses using various resources.</p> <p>Constructive play is similar to structured play because as it is a systematised method of play that applies purposeful thought to meet an objective. It differs from structured play in that preschool learners are more in control during this type of play, as opposed to structured play where it is the teacher who is more in control (Wood, 2013:23).</p>

## **1.5 PRELIMINARY LITERATURE REVIEW**

The following selected literature describes the importance of children attaining executive function and highlights the need to apply play-based learning within preschools.

### **1.5.1 Mandate for playful learning**

In recent years, studies have noted the need to improve learning through play (Fisher, Hirsh-Pasek, Newcombe & Golinkoff, 2013:1872; Weisberg et al., 2013:104). This concern is noteworthy, as it has been found that playful learning provides educational experiences that cultivate cognitive, social, emotional and physical skills; these skills facilitate school readiness in young children (Marshall & Fox, 2006:247). The importance of incorporating play during learning has led educational policies and authorities to promote this learning style (Wood, 2013:29; Weisberg et al., 2013:106). In South Africa, for example, the Early Childhood Learning Guidelines – a guideline that stipulates learning and teaching children in early years so that the child develops holistically and attains the necessary adaptive skills – convey principles that support play-based pedagogy (DBE, 2009:35; Department of Social Development [DSD], 2006:47; ISASA, 2015:117; Republic of South Africa, 2015:61). The policies were created to improve children's learning, their development and ultimately facilitate executive function (DBE, 2009:35; DSD, 2006:47; ISASA, 2015:117).

Literature emphasises that executive function is an important prerequisite to formal learning (school readiness and social adjustment) and play-based pedagogy has been found to enable preschool learners to develop this skill (Berk & Meyers, 2013; Petty & Coelho de Souza, 2012; Slot, Leseman, Verhagen & Mulder, 2015; Qu, 2011). The work of Daubert, Ramani and Rubin (2018) for example, concur that play is an essential learning tool that facilitates the acquisition of socio-emotional skills. This is because play enables children to attain the necessary social skills so that they can behave appropriately and abide by learning regulations – also noted as executive function (Benavides-Nieto, Romero-López, Quesada-Conde & Corredor, 2017:472). A lack of socio-emotional skills can affect preschool learners' ability to get along with peers – something that often results in antisocial or even disruptive behaviour (Nix, Bierman, Domitrovich & Gill, 2013:1000).



### **1.5.2 Understanding the nature of executive function**

Fleer et al., (2017:4) describe executive function as higher-order skills that help individuals plan, reason, and control their behaviour. Similarly, Levine and Munsch (2016:397) hold that executive function usually operates in a top-down manner where the cognitive faculties (brain) inform a person how to regulate or perform physical actions using one's body. Executive function enables people to control, organise and alternate between thoughts and actions to achieve an objective (Schoemaker, Bunte, Wiebe, Espy, Deković & Matthys, 2012:457). The thoughts and actions operate as a cognitive and behavioural guide that enables people to concentrate, as well as conduct tasks simultaneously (Center on the Developing Child at Harvard University, 2016:12).

Several works of research in the early education field have shown the significant impact which executive function has on learning (Diamond & Lee, 2011:959; Fitzpatrick, 2014:160; Harvard University, 2015:1). Executive function supports the internal and external factors needed for learning; hence enabling better learning experiences (Harvard University, 2015:1). Executive function is important for preschool learners because it promotes school readiness, equips children with the necessary skills to adjust to classroom schedules, and helps them attain academic success (Barker & Munakata, 2015:92).

### **1.5.3 Modern challenges of play as pedagogy**

Although research shows why play is essential for learning and development, certain barriers impede its implementation (Aronstam & Braund, 2015; Yogman et al., 2018). Studies have shown that the growing pressure to attain academic skills, amounts to less time being spent on play-based pedagogy (Bassok, Latham & Rorem, 2016:1; Holt, Lee, Millar & Spence, 2015:74). This is because lessons often aim to meet the curriculum objectives, leaving little room to incorporate play during learning experiences (Bassok, Latham & Rorem, 2016:1). Weisberg et al., (2013:104) postulate that in some cases, teachers struggle to balance the time needed to incorporate play with their teaching duties, which inevitably leads them to prioritise attaining academic skills over nurturing play. Similarly, the quest to have children attain the necessary skills, and maintain high marks, often leads to preschool learners developing anxiety or depression (Aronstam & Braund, 2015; Yogman et al., 2018). The acute focus on attaining academic skills removes the fun element of engaging and working alongside others which play should contain (Bassok, Latham & Rorem, 2016:1). This then leads

learners to perform poorly, and to rate their self-worth based on the marks obtained (Yogman et al., 2018).

From the preceding section, it is clear that children need adequate time and space to play during lessons. Play-based pedagogy needs to ensure that children attain purposeful skills during the learning experience (Gresko, 2014:n.p). Since teachers and parents sometimes have misconceptions about the benefits of play during lessons (Jiang & Han, 2016:n.p; Nicolopoulou, 2010:2), literature assures that play is not a waste of time, especially if teachers are hoping to help children attain the necessary skills (Aronstam & Braund, 2015; Gresko, 2014:n.p; Yogman et al., 2018). Play, for example, teaches children how to control their emotions, solve problems and plan the various steps to take towards a goal; these can be understood as executive function (Gresko, 2014:n.p). Ultimately, this study aims to explore how preschool teachers facilitate executive function through structured play.

## **1.6 CONCEPTUAL FRAMEWORK**

In 1978, Vygotsky documented how learning happens when children actively engage in their environment through social experiences (Bodrova & Leong, 2015:374). The ability to attain new knowledge and skills are far more effective during social interaction because it offers preschool learners the chance to engage with the knowledge or skill (Bodrova & Leong, 2015:375). Therefore, the Zone of Proximal Development and scaffolding is used as a conceptual framework since it explains how children are supported to attain various skills/outcomes guided by a more knowledgeable partner (Cutter-Mackenzie, Edwards, Moore & Boyd, 2014:20). This is discussed in more detail in the section on sociocultural theory (see 2.8.1), as a theoretical framework.

Secondly, Flavell's theory of metacognition (1976) entails the active monitoring or regulation of cognitive processes such as memory, attention and problem-solving; these processes ensure that our goals and learning objectives are met, comparable to executive function skills. Similarly, Mantyla, Ronnlund and Kliegel (2010:289) assert that the "metacognitive regulation is closely related to prefrontal mediated executive control processes; therefore, the metacognitive judgement and executive functioning are based on similar cognitive and neural connections". It is for this reason that the metacognitive theory is applied as the second theoretical framework to this study. The metacognitive theory explains how executive function can be exerted through

structured play, ultimately permitting preschool learners to commence formal schooling with the necessary cognitive and behavioural skills to function therein (Roebbers, 2017). Furthermore, Flavell's (1976) metacognitive theory best suits the study as it interprets the theory, development and purpose of executive function (Dunlosky & Metcalfe, 2009:45). Flavell's metacognitive theory together with metacognition enables people to plan, execute and alter their actions in order to accomplish a goal; this is discussed in more detail in chapter 2 (see section 2.8.2).

## **1.7 RESEARCH DESIGN AND METHODOLOGY**

Literature notes that the process of answering a research question determines the kind of design and methodology used (Creswell, 2014; De Vos, Strydom, Fouché & Delpont, 2005). I utilised a multiple case study within a qualitative research design in order to answer my research questions (Creswell, 2014:14; McMillan & Schumacher, 2014:371). The four case studies enabled me to explore the role of structured play in facilitating preschool learners' executive function; where I obtained various outlooks personally construed by the participants. By applying the qualitative research design, this permitted a comprehensive study of understanding how executive function could be taught through structured play (Johnson & Christensen, 2014:33; McMillan & Schumacher, 2006:345).

The cases were purposively chosen to cover the different approaches and curriculums found in South Africa (Silverman, 2013:148). One of the schools in the study, for example, follows the NCF document, whereas another follows the ISASA curriculum. The third school is a Montessori preschool and the fourth is a Reggio Emilia inspired preschool. All schools have children in age groups of 3–5-year-olds; however, the study focuses on four-year-olds since it is the age group that intentionally applies executive function skills (Center on the Developing Child at Harvard University, 2016). All the schools are situated in the city of Pretoria in Gauteng.

The data generation tools included semi-structured interviews, observations, field notes, photographs and lesson plan documents which were all analysed to gain a rich understanding of how preschool teachers enable executive function through structured play (Creswell, 2014:191-192; Marshall & Rossman, 2016:150; Phillippi & Lauderdale, 2018:381). Moreover, the data analysis entailed developing meanings from words, phrases and examples. The knowledge was later turned into codes, which

ultimately identified the main theme, as well as sub-themes (Bengtsson, 2016:9; Harding, 2013:13). By linking the themes with the study's selected literature, findings were generated. Chapter 3 provides a comprehensive account of the research design and methodology applied in the study. Next, the chapters of the study and their contents are summarised.

## **1.8 OUTLINE OF THE STUDY**

### **Chapter 1: Introduction and briefing**

The first chapter outlines the background and orientation of the study. Furthermore, it specifies the rationale, research questions and key concepts that guided the understanding of the research topic.

### **Chapter 2: A literature review**

The second chapter of the study thoroughly analyses what the literature presents. This includes understanding what executive function is, the importance it has for learning and how it is linked with play-based pedagogy. The chapter also looks at what the South African preschool curriculum stipulates about learning through play, and the important role it has in learning and development. The chapter concludes by describing the theoretical and conceptual underpinnings of executive function and structured play.

### **Chapter 3: Research methodology**

The third chapter discusses the research design that stipulates how the participants were selected and the research methods that were used to gather the data for the study. Chapter 3 also addresses trustworthiness and the ethical procedures that were followed to ensure the protection and safety of the participants in the study.

### **Chapter 4: Data analysis and interpretation**

The fourth chapter explains the analysis of the data obtained from interviews, observations and document analysis; and how the coded data were sorted into themes and sub-themes.

### **Chapter 5: Comparison of the research findings with the literature**

Chapter 5 compares the findings of the study with existing literature. Furthermore, the contradictions, silences in literature, as well as emerging insights are detailed in this chapter.

## **Chapter 6: Summary, conclusions and recommendations**

This chapter provides a summary of the main findings, together with the research questions. It also discusses the limitations, recommendations and finally offers my concluding remarks.

### **1.9 CONCLUSION**

The first chapter offered an introduction to the study and provided the rationale for the research. It described how research questions were developed and presented the key concepts that directed the study. The chapter briefly presented the research design and methodology and concluded with an overall summary of what the chapters of this research report will present. In the following chapter, a review of some of the literature will be offered in order to understand the nature of executive function and structured play; and present some views on how structured play can facilitate executive function in the preschool learning context.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 INTRODUCTION**

The first chapter provided the introduction and the background to the study. This chapter presents a review of a selection of the literature on the role of structured play in facilitating preschool children's executive function. This chapter explores existing literature by first looking at executive function in history before exploring how it can be developed in young children. After exploring executive function and early childhood educational guidelines, structured play is discussed in-depth. Finally, the conceptual framework was used to gain a better understanding of how executive function is taught at preschool level.

### **2.2 A HISTORY OF THE RECOGNITION OF EXECUTIVE FUNCTION**

Luria is widely recognised as one of the prominent figures who developed an understanding of the term 'executive function' (Luria, 1966, 1973, 1980). This is because his works provide important insight to three cognitive areas consisting of "(1) arousal-motivation (limbic and reticular systems); (2) receiving, processing, and storing information (post-rolandic cortical areas); and (3) programming, controlling, and verifying activity, depending on the activity of the prefrontal cortex" (Ardila, 2008:92).

Towards the end of the 19th and beginning of the 20th century, more research documented various behavioural disorders under 'frontal pathology' (Ardila, 2008). Though the prefrontal cortex played a vital role in executive function, it was discovered that other areas of the brain are also involved in the functioning of the skill (Ardila, 2008). Luria (1966, 1969) showed the connection between the prefrontal lobe activities and executive function, as well as how it relates to motor behaviour, inhibiting immediate responses, problem-solving, self-regulation, reorienting and consciousness.

## 2.3 UNDERSTANDING EXECUTIVE FUNCTION

In describing the meaning of executive function, Hartung, Engelhardt, Thibodeaux, Harden and Tucker-Drob (2019:2) explain that executive function comprises of skills that permit people to achieve their desired objectives effectively, deliberately, unwaveringly, and autonomously. Because the term has no specific description (Doebel, 2020; Kavanagh, Ryan, Horan, 2020), literature mostly defines executive function on the basis of three skills namely, the working memory, inhibitory control, and cognitive flexibility (Diamond, 2013:1; Messer, Bernardi, Botting, Hill, Nash, Leonard & Henry, 2018:2). These three skills regulate our thoughts and actions ultimately determining how we achieve a goal.

Cognitive operations identified within executive function vary in several ways; these include figuring out how to achieve a task or deciding in what way to proceed. Taking into account that executive function deliberates thought processes, executive function enables people to decide; prepare; aim; and execute various tasks (McClelland & Camron, 2019:143; Perone, Simmering & Buss, 2021). Furthermore, Barkley (2012:60-61) deems that executive function helps a person analyse what they know, what they are aware of, and explore the forms in which they can achieve their goal. This makes it clear that since executive function covers several cognitive operations that work together towards achieving a goal, it includes higher mental functions that regulate lower cognitive processes to ultimately, direct our thoughts and behaviour (Viana-Sáenz, Sastre-Riba, Urraca-Martínez & Botella, 2020).

Based on the summary above, executive function organises the actions involved in completing tasks. It successfully devises a plan of action consisting of forming, selecting and arranging the ideas that would enable a person to achieve a goal (Hoffman, Scheichel & Baddeley, 2012:174; Laureys, De Waelle, Barendse, Lenoir & Deconinck, 2022). According to Blair (2016:102), devising a plan of action enables a person to achieve a goal since it helps them refrain from inappropriate actions, but remain focused instead. Thus, exerting executive function would enable appropriate, responsible, and self-serving actions to achieve a goal (Ackerman & Friedman-Krauss, 2017:2). This is because the skill leads people to manage, lead and control their thoughts and behaviour when tackling a task.

## 2.4 DEVELOPMENT OF EXECUTIVE FUNCTION

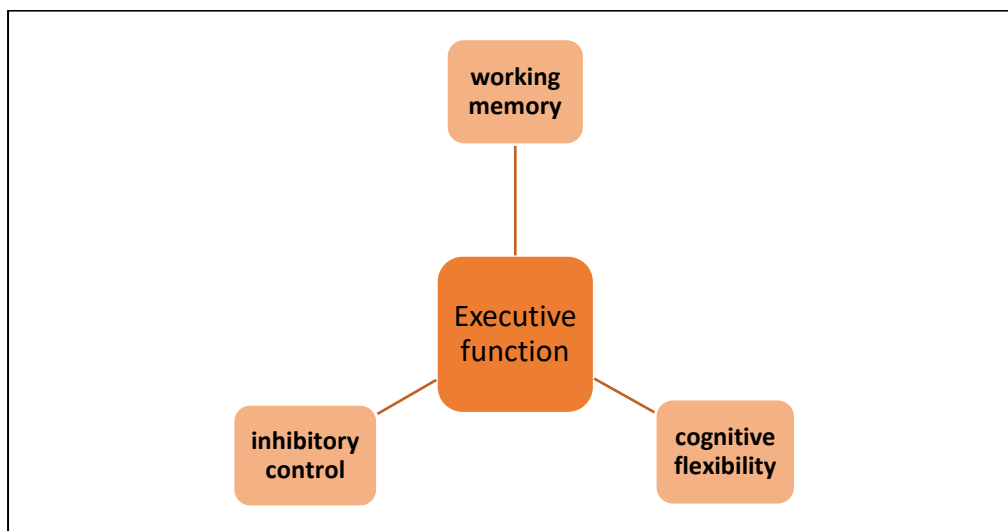
Biology, coupled with genetic factors develop executive function skills; however, the environment, as well as the context of childhood upbringing, also have an impact on the development of the skill (El Wafa, Ghobashy & Hamza, 2020). According to Traverso, Viterbori and Usai (2019:2-3), executive function in young children develops rapidly during the early years and later improves in adulthood. Although its growth is not particularly linear, Ackerman and Friedman-Krauss (2017:3) noted that the evolution of the skill transpires through the growth of the frontal lobes developing in adulthood. However, Monette, Brigas and Lafreniere (2015:125) argue that while most mental skills develop during the early years, the stages of development need to occur prior to the skills fully operating. So in the case of executive function, its developmental stages entail three categories known as *emerging* (first phase of procurement that is not yet practical), *developing* (although some skills are present, they do not fully operate), and lastly *the established field* (fully developed skills) (Ahmed, Tang, Waters & Davis-Kean, 2018:5; Ganesan & Steinbeis, 2021). This enables effective operation of the skills, as well as growth in our cognitive and behavioural actions.

According to Duval et al., (2016:39), neurological connections of executive function derive from stimulating activities, social interactions, as well as the learning environment. Rothlisberger, Neuenschwander, Cimeli, Michel and Roebbers (2012:413) point out factors that contribute to the development of executive function includes curriculum training, individualised training, as well as teaching the skills at home. Lastly, games, computerised training and martial arts are some of the exercises that help develop executive function skills (Diamond & Lee, 2011:960). The activities mentioned enable children to both improve decision-making and learning skills (Diamond & Lee, 2011). Interestingly, several scholars support the notion that the most prominent factors related to social interactions that enhance executive function include care, receiving affection and attention from parents, scaffolding when problem-solving, obtaining guidance during decision-making, and supporting the child to discover new frontiers (Boivin & Bierman, 2014:214; Dishion, 2016:57-58; Miller-Cotto, Smith, Ribner & Wang, 2021). Thus, the need to cultivate executive function through interactions is vital for preschool learners' as it strengthens their capability to exert the skill in adult life.



The work done by Zhou, Yu, Dong and Zhang (2022) reveal that children who experience great stressors every day hamper the growth of executive function; this is because the brain connections that underlie executive function are easily affected by experiences, such as stress. It is a wide held view that stressful environments such as living in a poverty setting or experiencing a traumatic event, can inhibit the growth of the neural connections that facilitate cognitive functioning (Center on the Developing Child at Harvard University, 2016:11). Thus, learning activities should be directed towards enhancing executive function skills instead of diminishing its growth.

The following figure depicts the main elements of executive function; this includes working memory, inhibitory control and cognitive flexibility.



*Figure 2.1: Elements of executive function*

### **2.4.1 Inhibitory control**

The first component of executive function is inhibitory control, also known as self-regulation. Literature explains that inhibitory control permits people to fight disruptions and overcome instant urges in favour of suitable behaviour (Diamond, 2013:2; Zelazo, Blair & Willoughby, 2017:3). Inhibitory control is the ability to govern thinking, behaviour and/or feelings above prevailing internal urges or external enticements (Zelazo et al., 2017). Its absence could result in impulsive action and thinking or behaving according to incentives that might drive our focus towards different directions than those that are suitable (Liman & Tepeli, 2019:648). The skill does not only alter behaviour but also enables us to reflect on our actions possibly redeeming us from embarrassing situations (Liman & Tepeli, 2019).

Various authors agree that the delay of gratification is evident in preschool learners; this is seen when children are able to wait and select items of their choice (Best & Miller, 2010; Hoffman, Schmeichel & Baddeley, 2012; Monette et al., 2015). The ability to wait equates to withholding certain responses, whereas selecting an item implies taking one whilst leaving another. The work by Hoffman et al., (2012) report that inhibitory control is strengthened as children attain the means to suppress voluntary actions; they can overpower certain reactions to find a solution when solving a problem. Garon, Bryson and Smith (2008:40-41) describe that during the preschool years, the ability to manage inhibition as well as instigation, lead children to succeed in various tasks. For preschool learners to implement inhibitory control, they require verbal queues (songs/instructions) to control their actions (Garon et al., 2008:42). Moreover, adults need to offer approaches outlined in a top-down manner; meaning the children follow the educator's orders. These strategies guide children's actions when problem-solving. In summary, inhibitory control is noticeable when children manage to keep instructions in mind, respond according to those instructions, and prevent certain behaviours thus achieving a goal (Garon et al., 2008:42).

#### **2.4.2 Working memory**

The second component of executive function, namely the working memory, allows people to memorise and grasp information during tasks; as well as recall information to help make decisions (Diamond, 2013:7-8; Finch, 2019:1-2). This mental framework deals with storing information in order to be able to apply it (Zelazo et al., 2017:3). Several scholars support that the working memory acquires its information through verbal memory and visual-spatial memory (Garon et al., 2008; Hughes, Ensor, Wilson & Graham, 2010). The working memory plays a vital role when reasoning and interpreting new meanings; thus, it retains necessary details that can then be applied appropriately when executing tasks (Wiebe et al., 2011).

According to Hoffman et al., (2012), the means to retain mental information starts at a young age and develops beyond the preschool years. This is evident from children being able to remember two or three items over a lengthy period. Best and Miller (2010:1648) further explain that preschool learners can hold information when they are doing one task at a time, rather than multitasking. During the preschool phase, the working memory encapsulates mental representations, as it enables the ability to store and recall information easily (Best & Miller, 2010). During the preschool phase, the

working memory experiences more challenging tasks, such as updating and manipulating information (Monette et al., 2015:121). Secondly, there is a better organization in the area of attention and memory storage (Monette et al., 2015:121). Older preschool learners, for example, cluster information according to separate factors; this enables them to identify and distinguish unique traits of different concepts (Monette et al., 2015:121). Children can remember ideas or steps better through instructions and songs (Garon et al., 2008:39). Thus, literature advises the strengthening of the working memory in a fun and interactive manner (Anderson, 2000; Diamond, 2013:7; Garon et al., 2008:40).

### **2.4.3 Cognitive flexibility**

The final major component of executive function is cognitive flexibility. Braem and Egner (2018:4-5) explain that cognitive flexibility is the opposite of rigidity; it thus permits people to change their outlooks on a topic and to focus on achieving a goal. When problem-solving, one needs to consider different ideas/tools that one might not previously have thought of in order to produce something new (Braem & Egner, 2018). It is believed that cognitive flexibility enables the ability to change requests or priorities, recognise wrongdoing and develop new/different opportunities (Diamond, 2012:336; Diamond, 2013:14).

According to Braem and Egner (2018), cognitive flexibility is evident in preschool children when children can shift their attention and apply different techniques in different circumstances. The ability to learn from mistakes and apply different methods develops during the early years and further matures around middle age (Best & Miller, 2010:1650; Garon et al., 2008:43-46). This is evident in children working slower when they are not familiar with various operations (Monette et al., 2015). However, as they grow older and become more acquainted with those operations, the child acts more swiftly and performs the tasks correctly (Monette et al., 2015). In support of this stance, younger preschool learners are sometimes too impulsive to effectively apply executive function skills, whereas older preschool learners are more deliberate in planning and taking precautionary measures when solving a problem (Diamond, 2013:14; Wiebe et al., 2011:439). Two areas of cognitive flexibility that preschool learners struggle with are multi-tasking and reversing operations (Anderson & Reidy, 2012). This is because preschool learners struggle to achieve different objectives at the same time, and they find it difficult to manage information in their short-term memory (Anderson & Reidy,

2012). Thus, few preschool children are able to reverse an order successfully (Diamond, 2013:14). For preschool learners to develop cognitive flexibility, research suggests that adults provide demonstrations and reminders or various tools/resources to perform a task (Ackerman & Friedman-Krauss, 2017; Anderson, 2002; Blair, 2016).

#### 2.4.4 A list of other executive function skills

Apart from the three main executive function skills that have been discussed so far, Table 2.1 identifies and explains additional executive function skills.

Table 2.1: Other executive function skills

SKILL	DEFINITION	EXAMPLE
<b>Attention</b>	The ability to concentrate on an aspect that is being presented	Eliminate distractions to complete a task
<b>Time management</b>	Calculating time to ensure the objective is met	Watching one's pace during an activity
<b>Prioritising</b>	The mental operation that decides which step is necessary and important towards achieving the goal	Deciding what is: <ul style="list-style-type: none"> <li>• important</li> <li>• what needs focus</li> <li>• what needs to be done first</li> </ul>
<b>Task initiation</b>	Instigating/establishing actions that will allow a preschool child to achieve their goals	Commencing early enough with a task to have enough time to complete the activity
<b>Planning and Organisation</b>	Gathering thoughts and tools to arrange them in systemised forms. Outlining measures to complete a task	Contemplating materials/tools that need to be gathered to accomplish a specific goal. Thinking about the order of steps – which comes first and which come thereafter

Source: (Meltzer, 2010:8).

#### 2.4.5 The importance of executive function

The argument put forward by Bryce, Whitebread and Szucs (2015:181) is that executive function supports learning through the means of concentrating, memorising, and strategising. The ability to concentrate and memorise during lessons enable learners to attain academic success (Bryce et al., 2015). Learning can only occur if the brain is capable of effectively regulating thoughts and actions to achieve the desired goal (Gordon, Smith-Spark, Newton & Henry, 2018:1). Zelazo et al., (2017:19-20), as well as Diamond and Ling (2016:35), affirm that executive function is more

important than IQ since it allows the child to effectively function within the formal learning environment; executive function skills facilitate acquisition, comprehension, and application of the knowledge that children attain in formal schooling.

Studies highlight, that preschool children whose executive function skills are still developing struggle with both learning and functioning in the schooling environment (Moffitt, 2012:50; Moffitt, Arseneault, Belsky, Dickson Hancox, Harrington & Caspi, 2011:2693). According to Morgan, Farkas, Wang, Hillemeier, Oh and Maczuga (2019:20), such challenges may negatively affect relations within the school environment and ultimately affect the learning performance. Thus, school readiness should entail more than just having subject knowledge (alphabet and numbers); instead, it is important that children have the ability to work effectively alongside, and to interact with others (Fitzpatrick, 2014:157; Shaul & Schwartz, 2014:751). Executive function enables children to attain the necessary skills when they work and respect their fellow peers; assists them to adjust better and to learn from others (McClelland & Cameron, 2019:144). Harvard University (2011:8) agrees that executive function forms the underlying base that enables learning and social development in preschool learners.

Various studies have found that the development of executive function during the early years has great effects on lifelong learning and success (Diamond & Ling, 2016:35; Traverso, Viterbori & Usai, 2019:2-3; Zelazo, Forston, Masten & Carlson, 2018:148). Firstly, executive function enables children to work flexibly when solving problems (Braem & Egner, 2018). Secondly, apart from cognitive flexibility, executive function facilitates children to operate in rule-based situations where they need to abide to instructions; this includes regulating one's behaviour and selecting appropriate responses to obtain a goal (Bierman, Nix, Greenberg, Blair & Domitrovich, 2008:821). Executive function also generates mental guidelines (necessary steps) when working in different settings (formal and informal places) (Harvard University, 2011:5). This is because it combines an array of cognitive as well as behavioural skills that direct human responses when completing various tasks. In summary, executive function develops the skills needed for academic success (Gunzenhauser & Nückles, 2021; Kavanagh, Ryan & Horan, 2020; McClelland & Cameron, 2019:144). It is for this reason that early childhood educators should facilitate the growth of executive function.

#### **2.4.6 How executive function skills are interrelated**

Shaul and Schwartz (2014:751) have found that executive function operates in the frontal cortex as it forms an intricate part of regulating and applying different cognitive, as well as behavioural skills. A widely held view is that cognitive and behavioural skills are essential to regulating/processing information, as well as delegating steps to reach the desired outcome; hence, executive function integrates cognitive and behavioural skills to achieve the desired outcome (Ackerman & Friedman-Krauss, 2017). Shaul and Schwartz (2014:751) postulate that, in as much as cognitive activities are distinct from one another, they operate collectively to establish executive functioning in a top-down manner needed to regulate premeditated thoughts or goal-oriented actions.

Secondly, inhibitory control sustains the working memory in that it controls behaviour by applying necessary actions; it permits a child to concentrate and capture information/details more easily (Diamond, 2013:8). Diamond (2013:8) states that by focussing on specific details (inhibitory control), there are fewer chances of forgetting or committing mistakes (working memory). This is why visual cues assist children to recall information; they facilitate the means to store information needed for use (Dias & Seabra, 2017:471-472). According to Cooper-Kahn and Dietzel (2008:13), inhibitory control supports the working memory in that it links various ideas or realities together – this includes the ability to concentrate on various aspects and to integrate these into different realities.

Regarding cognitive flexibility, Diamond (2013:8) states that it comes about as a result of applying different methods retained within the working memory to achieve certain goals. Meltzer (2010:9), points out that the working memory also supports cognitive flexibility in that it facilitates thinking and creativity so that actions do not become repetitive; it permits a person to produce new/different ideas. The ability to concentrate, for example, can only come about through inhibitory control and other executive function skills such as paying attention, prioritising and organising oneself (Ganesan & Steinbeis, 2021). In this regard, it keeps out unnecessary details or removes information that is no longer useful (Meltzer, 2010:9).

Scholars concur that the absence of executive function skills would leave a preschool learner easily distracted, wasting time and ultimately fail to meet the learning outcome (Schoemaker et al., 2013; Morgan et al., 2019; Cooper-Kahn & Dietzer, 2008). Diamond (2013:8) maintains that for preschool children to achieve a goal, they should

be able to restrain internal and external distractions regulated by inhibitory control. Consequently, various executive function skills work towards enabling working memory, inhibitory control, as well as cognitive flexibility. Together they operate towards achieving an ultimate goal such as finishing a chore or the learning objective.

## **2.5 SUMMARY OF EARLY CHILDHOOD EDUCATION PROGRAMMES**

The following section of this literature review illustrates the nature and function of early childhood education (ECE) programmes in South Africa and around the world. ECE policies, as well as their framework, are outlined. The summary highlights the vital role that ECE plays in children's learning in preschool years.

### **2.5.1 International contexts**

Under this section, the study explores international ECE contexts to obtain a broader understanding of how early childhood learning programmes have been fostered and administered around the world. The study analyses early childhood education in countries such as Canada, Finland, New Zealand and Singapore outside the African continent; and Botswana, Egypt, Ghana and Kenya within Africa. The purpose of this is to provide a brief overview of ECE around the world, and to demonstrate how the different countries implement early childhood education. For each country, I explored ECE background/government, curriculum and teaching of executive function. It is worth noting that ECE, ECCE, and ECEC are various concepts that represent preschool learning in this study's context (see Table 1.2). Table 2.2 provides a summary of the international preschool education construct.



Table 2.2: International preschool education constructs

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
<p><b>Canada</b></p> <p><b>Sources:</b> Ontario Ministry of Education, 2013:2; Ontario Ministry of Education, 2014; Ontario Ministry of Education, 2016:48.</p>	<ul style="list-style-type: none"> <li>• Early childhood education in the country is mandatory for children birth to six years. The exception to this is noted in Ontario and Quebec, where children can commence formal schooling from the age of four</li> <li>• Currently, there is no single policy or department of education. Hence, all ECEC guidelines and techniques have been integrated throughout the country to assist in the development of young children</li> <li>• Separate provinces and states have full authorized control to manage their Early Childhood Education and Care (ECEC)</li> </ul>	<ul style="list-style-type: none"> <li>• With the need of a single early education curriculum throughout the country, Canada is directing various provinces to update their learning guidelines to concentrate on outcomes that emphasise the need to utilise play, as well as incorporate children’s stories</li> <li>• Teachers are the persons who can foster emotional development that includes self-concept, confidence, independence, and self-control – through the means of creating a caring and nurturing environment</li> </ul>	<ul style="list-style-type: none"> <li>• Executive function is briefly addressed in the curriculum, highlighting the important role it plays in emotional development</li> <li>• Problem-solving and different methods of handling conflict are some of the ways teachers can support children to adopt better behavioural responses</li> <li>• Teachers are required to facilitate scaffolding for children to attain both self-regulation and emotional regulation. This will permit them to grasp a better understanding of different emotional responses and natures of others</li> </ul>
<p><b>Finland</b></p> <p><b>Source:</b> Salminen, 2017:136.</p>	<ul style="list-style-type: none"> <li>• The country’s early education works according to ten objectives arranged by the Early Childhood Education and Care Act (580/2015), which forms and direct teaching methods in ECEC</li> </ul>	<ul style="list-style-type: none"> <li>• Early Childhood Education and Care (ECEC) in Finland encapsulates purposeful learning with teaching styles that provide a well-rounded approach designed to improve children’s development</li> </ul>	<ul style="list-style-type: none"> <li>• The curriculum does not directly outline the nature or necessity of enhancing executive function from a young age</li> <li>• This compels educators to acknowledge and reflect on</li> </ul>



COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
		<ul style="list-style-type: none"> <li>• Preschool learning in Finland works according to accommodating children's interests, recognises their opinions and protects children's wellbeing</li> <li>• Its objective is to then nurture the overall growth, development, safety and wellbeing of children in suitable ways</li> <li>• The curriculum fosters and directs appropriate activities that support quality childhood education</li> </ul>	<p>unique ways of providing necessary support through specialised intervention. Furthermore, it enables a stronger bond between the child and preschool educator as they interact; these further assists children with cooperative and social skills which also enhances cooperation during group activities</p>
<p><b>New Zealand</b></p> <p><b>Sources:</b> New Zealand Ministry of Education, 2017; Tesar, 2015:10-11.</p>	<ul style="list-style-type: none"> <li>• Preschool education in New Zealand is based on an assortment of learning and care principles established by its Ministry of Education, this is distinct from the formal schooling division</li> <li>• Presently, infant and toddler education has had mounting admissions for children under the age of two which resulted in various early education discussions</li> </ul>	<ul style="list-style-type: none"> <li>• The Te Whariki curriculum is supported by four tenets that include: empowerment (whakamana), holistic development (kotahitanga), family and community (whānau tangata), as well as relationships (ngā hononga)</li> <li>• Its curriculum framework was not founded to attain specific standards, rather utilise its criteria to strengthen teachers adapt the curriculum with children in any provided community, permitting children</li> </ul>	<ul style="list-style-type: none"> <li>• The curriculum does not particularly outline traits of executive function as preschool learning tenets centred on empowerment, holistic development, family and community, as well as relationships</li> </ul>

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
		<p>to grow holistically, and form strong relationships with a sense of feeling a part of one's community</p> <ul style="list-style-type: none"> <li>In summary, the curriculum offers a blueprint of how to abide pleasantly alongside others, their environment, different items, and operate with the historical tradition of Māori-Pakeha relationships</li> </ul>	
<p><b>Singapore</b></p> <p><b>Sources:</b> Bautista, Habib, Eng and Bull, 2019; Boocock, 1995; Ministry of Education, 2003; Ministry of Education, 2008:12-14; Ministry of Education, 2012; Tan, 2017:12.</p>	<ul style="list-style-type: none"> <li>The country embeds a tradition of Confucian values in the framework of the modern age</li> <li>Preschool encapsulates both kindergarten and childcare centres, the ages range from three to six years</li> <li>In 2008 the Ministry of Education created a guide for preschool learning activities, as well as provided recommendations for children's development</li> </ul>	<ul style="list-style-type: none"> <li>Preschool and kindergarten centres in Singapore do not have a national curriculum that recommends how lessons ought to be instructed. This outcome led the country to adopt a wide range of teaching styles that cater to unique subjects and learning models</li> <li>Thus, in January 2003, Singapore underwent a process that sought to enhance its kindergarten curriculum and teaching by introducing the NEL Framework - Nurturing Early Preschoolers: A Framework for A Kindergarten Curriculum in Singapore</li> </ul>	<ul style="list-style-type: none"> <li>Singapore's ECE curriculum mostly addresses children's development and learning through structured play and social interactions; it does not particularly speak to enhancing executive function skills</li> </ul>

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
		<ul style="list-style-type: none"> <li>• While the NEL Framework is not compulsory, it is the first formal document that guides preschool and kindergarten learning recognised worldwide</li> <li>• The NEF Framework not only outlines the role teachers have to enhance children’s development; it also employs the six principles that guide teaching and learning which include “(1) integrated learning, (2) teachers as supporters of learning, (3) engaging children in learning through play, (4) ample opportunities for interactions, (5) children as active preschoolers and (6) holistic development” (Tan, 2017:12).</li> <li>• The curriculum stresses the importance of employing structured play activities that work towards the goal of learning something; meaningful learning with the assistance and direction of educators during child or teacher-centred activities</li> </ul>	

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
<p><b>Botswana</b></p> <p><b>Sources:</b> Bar-On, 2004: 69-72; Bose, 2008:77; Maundeni, 2013; Maunganidze &amp; Tsamaase, 2014:3-4; the Republic of Botswana, 2001:4.</p>	<ul style="list-style-type: none"> <li>Initially, ECCE was directed by the National Day-care Centre Policy (NDCP) of 1980, which administered operation, organisation and structure for children in the age group of two to six years</li> <li>The NDCP struggled to support matters related to the development of educators, curriculum, and learning programmes so then the ECCE got drafted under the Revised National Policy on Education (RNPE) of 1994</li> <li>The RNPE gave the Ministry of Education the portfolio responsible for recording, directing the curriculum, training its educators and developing a teaching guideline</li> <li>The Ministry ultimately developed the Preschool Unit for the purpose of planning and co-ordination learning activities particularly in the ECCE sector</li> </ul>	<ul style="list-style-type: none"> <li>In 2001, Botswana formulated an ECCE policy that sought to “provide a holistic approach to developmental needs of a child, in particular its healthy growth and preparation for primary education” (Muandeni, 2013:55). It aimed to “develop care and education services for children to promote opportunities for their full physical, cognitive, social, emotional and mental growth and stimulation” (Muandeni, 2013:55).</li> <li>Presently, there exists no approved curriculum; the forerunners in ECCE centres consist of NGOs, private bodies and religious groups; and the primary language used during the first three years consists of Setswana proceeded by English. Hence, Botswana’s Ministry of Education is hoping to develop a curriculum currently being tested in 31 schools across the country</li> </ul>	<ul style="list-style-type: none"> <li>While ECE forms part of primary schools, there is a lack of substantial evidence to demonstrate how its learning system has functioned over the years</li> <li>This outcome consequently limits literature to explore techniques integrated into preschool learning aimed at enhancing executive function</li> </ul>

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
<p><b>Egypt</b></p> <p><b>Sources:</b> Makhlouf, 2019: 200-201; Mwamwenda, 2014:1408; Stopikowska and El-Deabes, 2012:129-130; UNESCO, 2007:4-5.</p>	<ul style="list-style-type: none"> <li>• Early Childhood Education is founded on Arabic principles</li> <li>• Children who attend nursery and preschools are aged between two to six years</li> <li>• Both these teaching groups operate under the Ministry of Social Affairs and Ministry of Education</li> <li>• A large number of preschools in Egypt are run by private organizations, religious schools, day-care centres and private homes</li> </ul>	<ul style="list-style-type: none"> <li>• Kindergarten learning usually centres on pre-academic orientation. The activities therein are developed in agreement with learning standards of religion, cooperation and physical development</li> <li>• The primary area of ECE focuses on preparing the child for formal school by introducing basic tasks of reading, writing and counting. Secondary goals target sensory-motor and emotional-social skills in children</li> <li>• Around 60 – 70% of learning focuses on academic learning whereas 30 – 40% focuses on language-based activities (this includes rhyming, storytelling, chanting and making crafts). For the most part, ECE activities in Egypt centre on play</li> </ul>	<ul style="list-style-type: none"> <li>• Preschool centres in Egypt mostly instil self-learning and avail various learning opportunities that enable independent work, discovery, investigation and experimenting</li> <li>• The second objective is aimed at progressing the child's way of thinking and developing cognitive skills to adjust to a changing world</li> <li>• All of the factors relate to executive function skills, which ultimately provide a brief idea of how preschool learning in Egypt enables the acquisition of executive function skills in children</li> </ul>
<p><b>Ghana</b></p> <p><b>Sources:</b> Mwamwenda, 2014:1408; NaCCA -</p>	<ul style="list-style-type: none"> <li>• ECE was founded by the Basel Mission also known as Class one</li> <li>• The Cape Colony Department of Education then introduced</li> </ul>	<ul style="list-style-type: none"> <li>• The early years learning curriculum (Kindergarten Curriculum for Preschools) is guided by three theoretical pillars that include Brain</li> </ul>	<ul style="list-style-type: none"> <li>• The Ghanaian kindergarten curriculum advocates for play to be integrated with the early childhood curriculum as this consequently permits children</li> </ul>

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
Ministry of Education, 2019: IV-VII.	<p>a syllabus intended for primary learning</p> <ul style="list-style-type: none"> <li>• This was proceeded private organisations providing help to the government by opening preschools throughout the country</li> <li>• ECE for 4-6- year-olds freely operate, making the numbers three times higher than private schools</li> </ul>	<p>research, Developmental theory and Social Constructivism</p> <ul style="list-style-type: none"> <li>• The curriculum views play as a medium of instruction that cultivates critical skills essential for child development and schooling success</li> <li>• It uses thematic approaches to blend various subjects and skills for children to practice. Therefore, educators are urged to employ empirical teachings and learning approaches that actively engross children in their learning</li> </ul>	<p>to think reasonably and creatively about different concepts</p> <ul style="list-style-type: none"> <li>• Parallel to enhancing critical thought and imagination, inquiry and discovery styles are utilised to allow children to solve social issues</li> <li>• Classrooms adopted a reading environment that encourages children to ponder, form, discover knowledge for themselves. This in turn enables means to both develop and enhance executive function skills through play</li> </ul>
<p><b>Kenya</b></p> <p><b>Sources:</b> NACECE, 2006:6; Nganga, 2009:228-229; UNESCO, 2005:20; Wadende, Oburu &amp; Morara, 2016:2-3.</p>	<ul style="list-style-type: none"> <li>• The Ministry of Culture and Social Services was assigned with the task of managing Early Childhood Education; yet close to the 1970s, it was tasked under the Ministry of Education. Then in 1997, the World Bank and Kenyan government introduced a vast seven-year Early Childhood Development (ECD) targeting the age group of birth to eight years</li> </ul>	<ul style="list-style-type: none"> <li>• According to UNESCO (2005:20), “the Guidelines for ECD in Kenya is the national ECD curriculum developed by the Kenya Institute of Education and used most widely in the country. The curriculum contains sufficient information for correct pedagogy – that is, child-centred interaction and emphasis on holistic development”.</li> </ul>	<ul style="list-style-type: none"> <li>• While emotional, mental and social and physical development can enhance executive function within their domain; Kenya’s ECE literature is limited in explaining how its policy directly enhances executive function skills within preschool learning</li> </ul>

COUNTRY	BACKGROUND, GOVERNMENT	CURRICULUM	TEACHING EXECUTIVE FUNCTION
	<ul style="list-style-type: none"> <li>Its mission sought to tackle various learning challenges and convert ECE centres into formal schools. Subsequently, this led to ECE specifically attending to children's learning and care - birth to eight years of age</li> </ul>	<ul style="list-style-type: none"> <li>Through the curriculum, children attain various skills such as emotional, mental and social and physical development as it enables children to mature successfully and healthily</li> </ul>	

## 2.5.2 The South African context

After analysing the international ECE context, the following section looks at the attributes and structure of ECE, particularly in South Africa. The purpose of this is to provide an overview of the guideline and curriculum applied in the country, as well as demonstrate how they facilitate learning and teachings in ECE.

In South Africa, ECE is a broad concept that encapsulates facilities that encourage or provide care for children aged birth to nine (DBE, 2009). These services include social security, documenting of birth dates, ensuring child wellbeing and security and inexpensive day-care facilities that help develop school readiness. ECE centres can be in a public or home-based environment, and the services work towards encouraging learning, through various services and resources during the early years (Meier, Lemmer & Niron, 2017:445-446). Although during the apartheid era, a vast majority of black African children were deprived of proper education, since 1994, the democratic government of South Africa has made early childhood development a focus area within education (Atmore, 2013:152-153).

A perusal of statistics pertaining to children in the past decade shows some distinct demographic factors that play an adverse role in the development of executive function of South African children. For example, Albino and Berry (2013) uncovered that, although their birth parents were alive, only 36% of children resided with both their parents. Furthermore, 19% of children cared for by relatives lived without parents, whereas 85% of children resided in households cared for by their grandparents. Meier, Lemmer and Niron (2017:446) noted that roughly 60% of children relied on the child support grant provided by the government. From these statistics, it is clear that a great number of young children in South Africa live in poverty. Harvard University (2011:5) argues that a constrained living environment, such as that imposed by poverty, inhibits the child from developing executive function skills. Ultimately, executive function cannot thrive within impoverished living conditions.

The NCF was adopted by the South African government and ECE teaching organizations that abide to worldwide views. These views (learning and teaching education guidelines) are endorsed by the United States of America, United Kingdom, as well as international ECE groups that include Asia Pacific Regional Network for Early Childhood (Biersteker, Dawes, Hendricks & Tredoux, 2016:334-335). Some of the reasons for following these international views include the value that can be gained



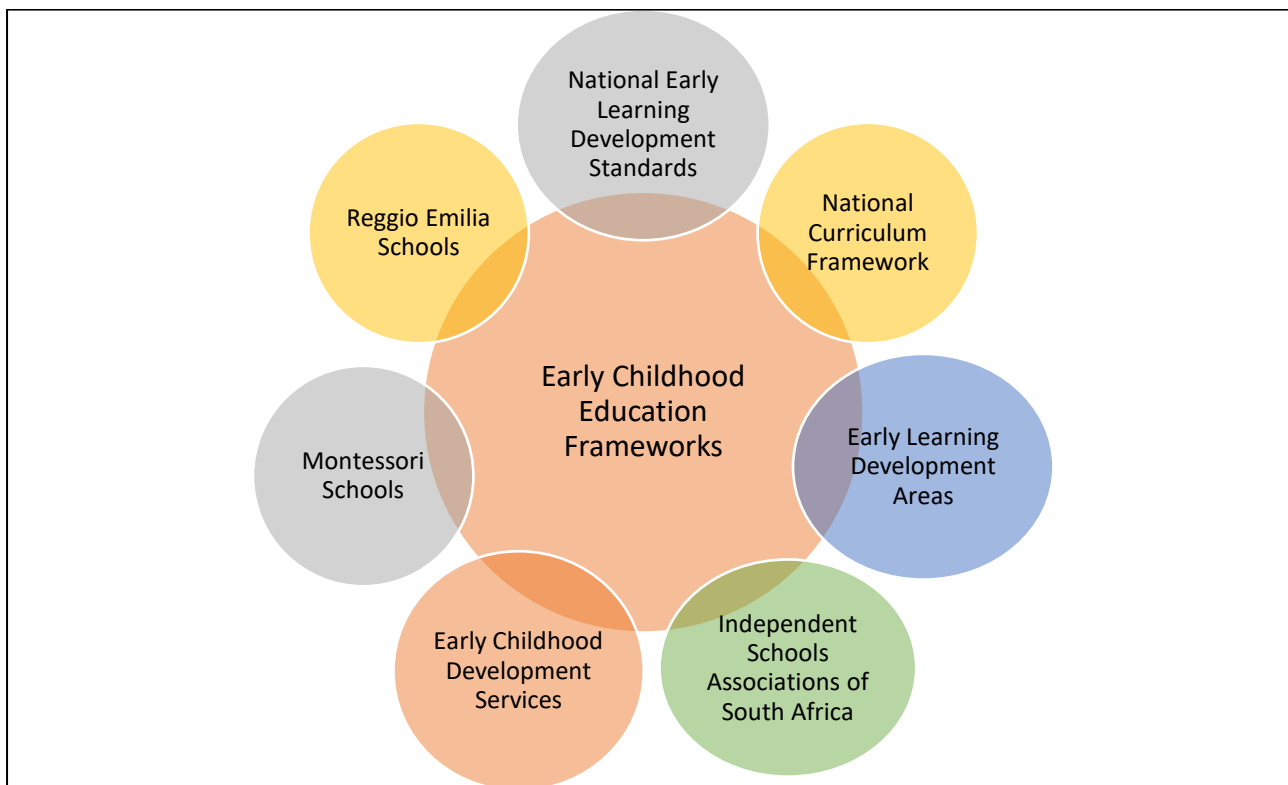
from the knowledge generated by countries that have successfully implemented ECE curriculums. The NCF offers children a wide range of suitable activities that promote cognitive, physical, emotional, and social development (DBE, 2015). Its early childhood learning programmes strive to obtain a balance between teacher-led exercises and free will activities where a caring nature, as well as the interaction between teacher and child encourages learning (Aronstam & Braund, 2015). According to Hunter, Graves and Bodensteiner (2017), teacher-led activities involve learning activities where the teacher takes the lead role of guiding and instructing learners, whereas child-led activities place learners at the centre of navigating a task, with free will to decide what activity they would like to do and how to achieve it. Kwon, Bingham, Lewsader, Joen and Elicker (2013) believe balancing teacher and child-led activities not only instils independent learning, but also guide learners as they face challenges along the way - the activities evaluate what learners can do on their own and the necessary assistance they need to complete the learning activity.

The following section strives to explore, as well as to understand the standard and framework that determine the nature of teaching and learning in South African preschools. My hopes would be to give a clear understanding of how teachers seek to facilitate executive function in preschool learning.

### **2.5.3 Standards and frameworks in South African preschool education**

After South Africa realised its democracy in 1994, resources were provided so that early childhood facilities could be established to attain fairness for underprivileged children (Atmore, 2013:154). ECE facilities for children aged five years and younger are part of the interdepartmental team that includes the National Departments of Social Development, Basic Education, and the Department of Health. Thus, the South African government, through White Paper 5 in Early Childhood Development, outlined a framework for 2009-2014 that focused on enabling admission to ECE centres; it detailed offering a widespread reception year for children aged five years right up until formal schooling (Biersteker, Dawes, Hendricks & Tredoux, 2016:334-335). After 1994, the government started focusing on improving early childhood education in the country and so, several policy documents were released to achieve this goal (Biersteker et al., 2016). In the process of doing so, National Early Learning Development Standards (NELDS) was the introductory policy document that brought awareness of how South African could improve ECE and establish a curriculum.

The next section discusses the National Early Learning Development Standards; National Curriculum Framework; Early Learning Development Areas; Independent Schools Associations of South Africa; Early Childhood Development Services; as well as the Montessori and Reggio Emilia schools in more detail.



*Figure 2.2: Early childhood education frameworks*

### **2.5.3.1 National Early Learning Development Standards (NELDS)**

When South Africa became a democratic republic in 1994, the early childhood sector identified significant areas that could contribute to the country's economic and social development; one of these areas included enriching ECE (DBE, 2009). Hence, government and independent organisations came together to develop a guideline that would assist the early childhood sector to improve; this guideline is referred to as NELDS - The National Early Learning Development Standards (DBE, 2009). The NELDS covers the basic principles of child development and the focus is on what a child needs for optimal development in his early years (DBE, 2009). The document unpacks how children grow and learn. The NELDS document does not provide curriculum content, it simply consists of principles, rules, regulations, and an explanation of developmental areas; curriculum content is covered in the National Curriculum Framework (DBE, 2009:7; DBE, 2015:8).

NELDS is a standard document that determines the learning prerequisites of children in the early years. This document consists of standards that determine the learning and development needs of children younger than 4 years (DBE, 2009:7). The document outlines “characteristics of children birth to four years; strategies for enabling positive growth and development of children; and pointers to developing early childhood stimulation programmes” (DBE, 2009:1). Thus, it highlights important developmental areas and recommends suitable activities that adults can introduce to improve preschool learning (DBE, 2009:7-8). Currently, there is no set curriculum for preschools in South Africa; the only available preschool learning guideline is the NCF, which outlines the Early Learning Developmental Areas (ELDAs) principles (DBE, 2015:8).

### **2.5.3.2 National Curriculum Framework (NCF)**

While NELDS was developed in 2009, the NCF got published in 2015. The NCF came as a result of the NELDS document. The NCF has served to guide teachers to teach and practise pedagogy in preschools. For example, in the NCF, ECE ‘subjects’ are considered to be ELDAs however, since we do not speak of formal ‘subjects’ at the level of preschool learning, the focus is rather on the holistic development of the child.

The NCF outlines three main themes that learning instructions should adhere to, these include “viewing young children as people, enabling young children’s learning and development, and facilitating young children’s connections with adults” (DBE, 2015:6). Ideally, preschool centres use the content of the NELDS document to understand the learning needs of the young child; whereas the content of the NCF focuses more on curriculum, pedagogy, and those activities that teachers and parents can practice with children to enhance their developmental needs (DBE, 2015). Thus, the NCF constitutes the curriculum framework that South African preschools follow. This framework can add different learning and teaching approaches to achieve various learning outcomes (DBE, 2009:7; DBE, 2015:8).

#### *Early Learning Developmental Areas (ELDAs)*

The NCF document was a response to some of the concerns around early education in the country. The framework offered directives according to which early childhood curriculums are to be implemented to enhance preschool children’s learning and development (DBE, 2015:3). The NCF is a framework that outlines the knowledge,

skills and developmental strengths that young children need, and offers possible guidelines for teaching practice for the early years (DBE, 2015:2;4). The NCF is intended as a framework that sets six principles (ELDAs) for preschool learning. These are (1) well-being, (2) identity and belonging, (3) communication, (4) exploring mathematics, (5) creativity, and (6) knowledge and understanding of the world (DBE, 2015:4). Conceptually, the NCF aligns with pedagogical content and the “assessment of each child’s developmental needs and learning interests” that looks to prepare young children for formal schooling (DBE, 2015:i).

### *Independent Schools Association of Southern Africa (ISASA)*

ISASA is founded on the present NELDS document that explored best learning practices within early childhood education (ISASA, 2015:3-4). Although envisioned as a teaching guide for privately owned schools, it can also be utilised by government-led learning institutions. The main goal of this document is to offer a national orientation to support uniformity with regard to requirements and programmes for preschool and the foundation phase in independent schools. These programmes were drafted using a widespread national survey, workshop and review process; incorporating curriculum content, as well as teaching practices that Southern African teachers apply (ISASA, 2015:3-4).

ISASA aims to offer the means to understand learning practices that are used nationally and internationally. Its various segments are not separated according to grades - instead, it provides a summary of teaching and learning from Grades 000 to Grade 3 (ISASA, 2015:3). Instructors must alter their teaching approaches according to children’s age. Over time, as educators and learning practitioners contributed clearer instructions that could facilitate successful learning content, new courses and practices were added to the ISASA curriculum document. For example, various skills can be instructed through demonstrations in classrooms – a teaching practice that is commonly used by most teachers (ISASA, 2015:3-4).

### *Early Childhood Development Services*

The Early Childhood Development Services consist of a directorate of the Department of Social Development to facilitate the progress of early childhood development in South Africa. It addresses important aspects in the early childhood phase such as nutrition, wellbeing, environmental security, early instruction and learning during the

early years. It is responsible for providing guidance to other departments with regard to policies, guidelines and communication that affect young children's lives (Department of Social Development, 2006:17; Republic of South Africa, 2015:48-49).

Early childhood development facilities ought to follow a holistic approach to attend to children's wellbeing, nourishment, growth, psychosocial and emotional needs (DBE, 2009). It is important that parents and teaching bodies cooperate to offer children unified assistance in optimal development in all spheres (DBE, 2009). As all people have the right to basic social services, they should have access to early education centres (Department of Social Development, 2006:17; Republic of South Africa, 2015:25-28). Thus, the Early Childhood Development Services policy document details and explains the kind of learning materials, learning centres and the course of action in teaching young children.

To conclude, section 2.5.1 outlined the Standards and frameworks in South African preschool education – specifically discussing the NCF, NELDS, ISASA and the Early Childhood Development Services policy – South African documents that outline the nature of learning and teaching in the South African context. The following section will focus on those curriculums and approaches that are aligned with the objective of the study by analysing the (i) Montessori approach, (ii) Reggio Emilia approach, (iii) NCF and (iv) ISASA curriculum.

## **2.6 A SELECTION OF ECE APPROACHES RELATIVE TO THE STUDY**

With the study exploring the role of structured play in facilitating preschool learners' executive function, this section analyses approaches and curriculums of the (i) Montessori, (ii) Reggio Emilia, (iii) government and (iv) private preschools and their guidelines in relations to the focus of the study. My reason for this was to unpack the major differences that exist in the learning bodies and note how the curriculums and approaches pertain to executive function, as well as play. Although other approaches, such as the Waldorf approach and African views on ECE can be found in South Africa (IASWECE, *n.d*; Pence & Marfo, 2008); for the purpose of the study, I will only highlight curriculum and approaches in relation to the focus of study.

### **2.6.1 Montessori approach**

The Montessori approach was originally developed by Maria Montessori in the 1900s, in Italy (Fitch, 2013:1). Its characteristics include viewing children as active beings, who are ready to learn about the world through play and attain knowledge from real-life experiences (Fitch, 2013:1). Under this approach, classrooms are arranged according to multi-age grouping; this is to encourage interaction and peer learning (Ozerem & Kavaz, 2013:12; Mooney, 2013). The Montessori approach strives to incorporate sensory integration, as well as control of movement, command, and the selection of tasks (Mooney, 2013). Learners are allowed to explore items in the classroom by themselves (without disrupting others) which enables independence in that they get to decide what they want to work with, and how (Fitch, 2013:2). Furthermore, learning spaces are arranged according to subject areas; there is a learning space solely dedicated to each of mathematics, science or reading. Teachers in Montessori schools generally observe and guide learners and only assist learners if they are struggling to complete a task (Ozerem & Kavaz, 2013:13; Mooney, 2013). Through implementing the curriculum, teachers illustrate the lesson to those individuals or small group of learners who display a readiness to progress to the next stage of acquiring knowledge and skills. The knowledge and skills that children are meant to attain from the approach include discovery; exploring; independence; practical life skills; self-reliance; completion of tasks; self-learning; and assembling and sequencing objects in subjects such as mathematics, language, science and geography, music and art (Fitch, 2013:3; Ozerem & Kavaz, 2013: 4; Mooney, 2013).

In relations to the study, neither executive function, nor strategies to develop the skill are specifically outlined (Fitch, 2013; Ozerem & Kavaz, 2013; Mooney, 2013). Executive function is enhanced through activities associated with decision making, working memory, self-regulation, planning, organising, attention and task initiation. In contrast to didactic learning, the Montessori approach deems that play has a great effect on learning, especially since it involves voluntary, enjoyable, purposeful and spontaneous activities (Fitch, 2013). The Montessori approach has several elements recognized under playful learning, namely, free choice, interactive lessons and intrinsic rewards (Fitch, 2013). The Montessori approach does not include role-play, such as dressing up, or engaging in fantasy play; rather play activities enhance problem-solving skills, interaction, verbal and physical skills (Mooney, 2013). It satisfies and enhances children's natural desire to learn; this permits children to

develop different ideas, socially integrate, as well as regulate their emotions. Play is a tool that shows children how to perform certain tasks, rather than follow instructions (Mooney, 2013). Ultimately, play constitutes a holistic learning approach that unifies the mind, body, and spirit (Fitch, 2013; Ozerem & Kavaz, 2013; Mooney, 2013).

### **2.6.2 Reggio Emilia approach**

The Reggio Emilia approach was originally developed by Loris Malaguzzi, in Italy, after World War I ended. This learning approach is based on the objective to stimulate children's relationships with their peers, family, teachers, society, and the environment (Thornton & Brunton, 2014). This results in developing inventive children who produce changes in the activities they are involved, and who, in turn, become originators of rights, principles and culture (Thornton & Brunton, 2014). Children have some control over their learning direction; teachers pick up on these cues and then seek to illustrate ideas that encourage children to further discover and investigate learning contents (Thornton & Brunton, 2014). The approach is child-centred where teachers note children's interests instead of relying on fixed instructions with regard to reading and writing (Thornton & Brunton, 2015; Mooney, 2013). The Reggio Emilia approach fosters emergent literacy by means of engaging and learning from others. The *Hundred Languages of Children* – a book that outlines aspects of the Reggio Emilia approach, is a significant tenet that demonstrates how lessons can incorporate drawing, music, science, and storytelling in children's learning (Thornton & Brunton, 2014; Thornton & Brunton, 2015; Mooney, 2013). This is because the Reggio Emilia approach relates to different forms of learning through the means of drawing, moulding, songs, science, creating, storytelling and performing (Thornton & Brunton, 2014; Mooney, 2013). Children learn to share their views, discoveries, and their mental strengths (Thornton & Brunton, 2015). The knowledge and skills that children are meant to attain include communication skills; utilising various senses; collaborating; exploring; and enhancing artistic abilities by drawing, painting, sculpture, constructing, shadow play, music, categorizing and participating in fantasy play (Thornton & Brunton, 2014; Thornton & Brunton, 2015; Mooney, 2013).

In relation to the topic of this study, the approach has no guideline that specifically outlines how executive function can be developed. Therefore, executive function is enhanced through activities associated with self-regulation, cognitive flexibility, planning and prioritising, organising and task initiation (Thornton & Brunton, 2014;



Thornton & Brunton, 2015). As far as play is concerned, although the teacher provides children with props during fantasy play, as well as additional tools/resources needed for indoor or outdoor play, children ultimately decide for themselves whether they would like to partake or not; the teacher then engages in those activities that the child shows interest in (Thornton & Brunton, 2015; Mooney, 2013). During play, children play with open-ended materials such as sand, water, playdough, blocks and paint (sensorial and hands-on); not only do they get to select the materials they would like to work with but also decide how to work with them. Learning activities within the Reggio Emilia approach are based on the knowledge and interests of the children, as well as observations of the teachers (Mooney, 2013). It includes various activities such as role-play, singing, dancing, exploring and problem-solving (Mooney, 2013). It also nurtures various qualities, such as working independently and the curiosity to explore knowledge within a setting that has been carefully arranged. Ultimately, children get to discover what certain objects are used for and in what activities (Thornton & Brunton, 2014; Thornton & Brunton, 2015).

### **2.6.3 National Curriculum Framework**

The National Curriculum Framework was originally developed in South Africa by the DBE (DBE, 2015:2). The framework serves as a curriculum guideline for babies and young children. The curriculum outlines what children need to sense, practice, listen to and understand; one of its objectives is to enable all children to acquire knowledge, capabilities, a mindset and appropriate behaviours for life, school and the working environment (DBE, 2015:2). The NCF support educators to develop effective lessons that would address children's interest and needs within the learning context. The document can be used in a variety of settings to improve children's learning experiences; it ensures that children from diverse backgrounds have access to good quality ECD services and that the document could be used in a variety of settings to improve children's learning experiences (DBE, 2015:4). According to the document, the knowledge and skills attained include "well-being; identity and belonging; communication; exploring mathematics; creativity; knowledge and understanding of the world" (DBE, 2015:2). Various training bodies, education experts, as well as parents, can draw on its knowledge to improve the learning and development experiences of children.



In relations to the study, within the NCF, executive function is developed through:

- “identifying and solving problems and making decisions using critical and creative thinking” (page 4).
- “working effectively as individuals and with others as members of a team” (page 4).
- “organising and managing themselves and their activities responsibly and effectively” (page 4).
- “collecting, analysing, organising and critically evaluating information” (page 4).
- “the encouragement to develop independence, self-control, cooperation and persistence to finish projects” (page 13).

Lastly, the document highlights that children acquire knowledge through three types of play: 1) *solitary play*, where children play alone, supervised by a parent or caregiver 2) *parallel play*, when children play next to each other and 3) cooperative play - a form of play that is enhanced when children commence playing with their peers (DBE, 2015:2;4). Knowledge is acquired as children play with different objects; children get to learn how these objects feel, how they work or understand and how they are formed (DBE, 2015:2;4). Hence, adults ought to ensure preschool children get sufficient opportunities to learn through play and to utilise open-ended materials during play.

#### **2.6.4 Independent Schools Association of Southern Africa**

The Independent Schools Association of Southern Africa is a curriculum guideline established in South Africa in the year 2014 (ISASA, 2015:3). Its methods and policies stem from local and international education systems (ISASA, 2015:3). The document offers a summary of lessons facilitating children’s learning and development (ISASA, 2015:3). According to the ISASA document, the core of the curriculum is developing children who can arrange, evaluate and comprehend vast amounts of information (ISASA, 2015:3). Teachers are encouraged to develop skills that enable the development of children who then become competent individuals in the modern world (ISASA, 2015:4). The curriculum centres on teaching social, emotional, mental and physical development through subjects that include language and literacy, numeracy, as well as creative arts (ISASA, 2015:4). In relations to the focus of this study, the executive function skills outlined in the ISASA curriculum include:

- “self-regulation” (page 7-9).
- “concentrating” (page 7-9).
- “taking turns and sharing” (page 7-9).
- “ability to draw on past/previous experiences and knowledge” (page 17).
- “initiating, planning and completing tasks successfully within allocated time” (page 21).
- “using various and appropriate thinking skills and strategies to organise, evaluate, compare, and analyse information” (page 117).
- “demonstrating metacognition: the awareness and understanding of own thought processes” (page 117).
- “reflects, reviews and evaluates what needs to be done better” (page 105).
- “and participation as part of a group or working independently” (page 105).

The curriculum strongly advises play for all children grades from Grade 000 to third grade (ISASA, 2015:4). Unstructured play is a prerequisite that forms part of most learning experiences, enabling preschool children to attain various knowledge and skills (ISASA, 2015:4). In the next section, play is highlighted as a means of embedding executive function in preschool learning in early childhood education.

## **2.7 PLAY IN EARLY CHILDHOOD EDUCATION**

### **2.7.1 Importance of play in early childhood education**

Studies on early childhood education show play to be necessary for children’s learning (Miller & Almon, 2009:22; Yeboah, 2015:9-10). Play is considered not only vital for children’s learning during early years, but an appropriate form of teaching in preschools and the foundation phase (Aronstam & Braund, 2015:2; Haney & Bissonnette, 2011:41-42). Piaget (1962) identifies play as the main mechanism that permits children to experience and discover items in their environment; hence, play is a form of learning, teaching and entertaining young children in preschool (Wood, 2013:24). Piaget (1962) further suggests that play is a spontaneous act that stimulates children to acquire knowledge of their world (Aronstam & Braund, 2015:2). Regardless

of children's age, children enjoy playing, which helps them develop their physical, cognitive, language skills, as well as self-regulation (Wood, 2013:24).

Wood (2013:9-10) describes play as a setting in which children can illustrate the knowledge they have learnt. In this regard, play assists children to attain self-confidence and positive traits, as this reinforces constant learning (Wood, 2013). Other learning areas that are enhanced through play include language, social and creative skills (Abdulai, 2016:29; Flear et al., 2017:2; Yogman et al., 2018:9). Play does not simply encapsulate entertainment but also introduces aspects of risk-taking, trials, and the recognition by the child of limits within actions (Flear, 2011:224). This can be stimulated through projects, subjects, children's interests and especially play (Aronstam & Braund, 2015:2).

Researchers who study play are often seen as powerful agents that can persuade educators and caregivers to adopt play in daily activities to help children pursue their interests (Pramling-Samuelsson & Carlsson, 2008:623; Sherwood & Reifel, 2010:322). Aronstam and Braund (2015:3) reveal how learning flourishes when children are given power over their activities; this includes having a say over what they learn and taking an active part in the choices that they make about their learning. Old fashioned teaching techniques, which constitutes the regurgitation of knowledge by children, have become obsolete; current teaching approaches demand the ability to rather utilise and apply the knowledge one has attained (Abdulai, 2016:28; Thomas, Warren & deVries, 2011:69). Hence, it is my opinion that teachers apply play-based learning often as possible as it will permit children to utilise, practice, comprehend and transmit the knowledge they have attained.

#### **2.7.1.1 Play-based learning: teaching through play**

According to van Oers and Duijkers (2013:516), play-based learning comprises learning activities that are designed in accordance to play. Its learning outcome assists children to problem-solve, attain various skills and comprehend knowledge of the world. Similarly, Edwards and Cutter-Mackenzie (2013:327) describe play-based learning as a teaching approach that applies play during learning activities. Play-based learning supports adult-child interaction during play that offers children the support they need when learning; it becomes the teacher's responsibility to offer support when teaching, rather than using techniques that encourage rote learning (Edwards &

Cutter-Mackenzie, 2013:328). Although play-based learning often entails teacher-led activities that initiate learning in children by integrating their interests and strengths; van Oers and Duijkers (2013:518) advise that teachers implementing play-based learning activities should strive to create a balance between children taking the lead role versus teachers determining the learning direction during play.

Exploring different types of play-based activities can assist teachers to comprehend the value of play as it equips teachers with the knowledge and skills to further apply play-based learning (van Oers & Duijkers, 2013:518-519). According to Leong and Bodrova (2012:29), play-based pedagogy has been found to facilitate school readiness. This is because the teaching technique cultivates essential skills such as academic learning, self-regulation, problem-solving, and cooperation, all of which play is a vital role in adjusting to, and succeeding in a formal school setting (Yogman et al., 2018:8). Play-based learning offers preschool teachers an opportunity to explore different values, opinions, attitudes, and experiences through play (Aronstam & Braund, 2015:3; Bautista et al., 2019:716). Furthermore, it enables children to comprehend knowledge better as it allows ideas to be conceptualised and applied in real-life contexts (Sezgin & Demiriz, 2019:1102). Yelland (2011:4-6) affirms that this kind of knowledge can help boost learning in disciplines such as numeracy, language, literacy and environmental studies. Play also helps to develop children's executive function skills, "children learn to adjust their actions to conform to the norms associated with certain behaviours, thereby practising the planning, self-monitoring, and reflection essential for intentional behaviour" (Bodrova, Germeroth & Leong, 2013:114). Thus, play, as utilised in play-based learning would foster various skills related to executive function.

Interestingly, although educational policies and guidelines acknowledge the need for and importance of developing executive function, there are very few teacher preparation programmes and continuous professional teacher development courses available to help equip teachers to facilitate and strengthen executive function skills in young children (Etokabeka, 2018). Another issue involves a lack of enriched opportunities that support play-based learning (Yogman et al., 2018:9). This can be observed in the absence of parks, centres, backyards and playgrounds – the common places where children spend most of their time playing (Miller & Almon, 2009:5). Early education centres in poorer communities often lack such facilities due to a lack of

resources that lead to poor infrastructure (Yogman et al., 2018:9). Yogman et al., (2018:9) found that in learning environments, some schools have poorly built playgrounds or have overfull classrooms which leave educators little room to plan lessons that are centred around play or to allow children to engage in play. Moreover, inadequate resources that can enhance learning through play, have resulted in teachers failing to apply play-based learning (Yogman et al., 2018:9). This is worsened by the challenge of issues such as children's safety, time allocation, and playground space when implementing play in inside and outside learning environments (Burdette & Whitaker, 2005:46).

### **2.7.1.2 Approaches to embedding executive function in preschool children**

According to Bodrova and Leong (2015:382), as well as Fleer and van Oers (2018:1095), curriculum programmes and play activities can enhance executive function within the preschool environment. These consist of (i) Tools of the Mind, (ii) Kids in Transition to School, (iii) Promoting Alternative Thinking Strategies, (iv) Chicago School Readiness Project, and (v) Creative Curriculum (Diamond, 2012:336; Sezgin & Demiriz, 2019:1101-1102). Beginning with Tools of the Mind, the curriculum programme was initially fostered and applied in Denver, Colorado, for children aged three to six years (Fleer & van Oers, 2018). The objective of the course aims to assist children to gain control over their actions; as well as to regulate their social, emotional, and mental conduct (Fleer & van Oers, 2018). Bodrova and Leong (2007) assert that Tools of the Mind consists of activities that pair mental capabilities with physical strengths. The programme fosters many other skills such as taking initiatives, self-regulating, as well as working independently (Bodrova & Leong, 2007).

Kids in Transition to School (KITS) is a programme that aims to develop and support school readiness – particularly building socio-emotional skills and early literacy in preschool learners (Diamond & Lee, 2011). The Promoting Alternative Thinking Strategies - also known as PATH is a curriculum programmes that stimulates inhibitory control by reducing aggression in young children (Crean & Johnson, 2013). The programme promotes the means to manage and overcome environmental triggers to anger. The Chicago School Readiness Project (CSRP) works similarly to Kids in Transition to School, as it promotes school readiness through minimising defiant and unruly behaviour through interventions that include teacher training in classroom behaviour management and mental health consultation (Watts, Gandhi, Ibrahim,

Masucci & Raver, 2018). According to Watts et al., (2018), the CSRP helps to develop preschool learners' emotional and behavioural skills through classroom interventions that can enable adjustment in formal schools. Lastly, Creative Curriculum comprises games/ tasks that permit teachers to develop executive function skills. The curriculum programme focuses on developing the whole child by providing creative, supportive and inclusive tasks that facilitate executive function (Fleer & van Oers, 2018:1096).

Play activities can enhance executive function within the preschool environment; imaginary and formal play (also described as structured play) assist with the growth of purposeful and self-disciplining behaviours related to executive function skills (Gibb, Coelho, Van Rootselaar, Halliwell, MacKinnon, Plomp & Gonzalez, 2021; Veresov, Veraksa, Gavrilova & Sukhikh, 2021). Bodrova and Leong (2015:382) explain that when children become engrossed in imaginary play, they not only practice appropriate behaviours, but also modify their actions, thereby exercising preparation, self-control and reflection. Moreover, play affects children's motivation, fosters mental representations, enables critical thinking, instils the means to consider other people's perspectives and nurtures both appropriate conduct and mental operations (Bodrova & Leong, 2015:382). Formal play is a play activity that is designed by the educator who ultimately determines how the activities will be outlined (Aronstam & Braund, 2015:70). In my opinion, it is through this form of play that teachers can help children practice executive function skills.

Interestingly, play and executive function are treated as separate entities within the South African context (Aronstam & Braund, 2015:3; Etokabeka, 2018:133; Fitzpatrick, 2014;159). A study that explored the understanding, as well as the implementation, of executive function in Grade R (Grade prior to Grade RR, see table 1.1), uncovered that while Grade R teachers help children to develop executive function skills, they are not aware of the term, and therefore leave out opportunities that could enhance executive function skills (Etokabeka, 2018:133-134). Grade R teachers however, do foster and enhance executive function by planning the learning objective in accordance with children's competencies; therefore, when preschool learners are good at working with different resources, the teacher utilises this opportunity to enhance their cognitive flexibility skill (Etokabeka, 2018). Another factor that enhances the implementation of executive function in Grade R consists of offering necessary support towards achieving specific outcomes (Etokabeka, 2018). Lastly, various

lessons within Grade R classrooms consist of multisensory tasks, visual presentations, repeating necessary steps and providing the space for differentiated learning - all of these are important for the development of executive function (Etokabeka, 2018:133-134).

### **2.7.1.3 Resources used during learning activities**

According to the Gauteng Department of Education (2012:9), resources/materials used during lessons are known as Learning and Teaching Support Materials (LTSM). LTSM comprise various materials or resources that are meant to make teaching and learning more effective (Riet, 2015:26). The main objective of these materials or resources is to assist teachers to attain their learning goals (Riet, 2015). Aligning with the Learning and Teaching Support Material Policy released in 2012, Riet (2015:26) describes LTSM as materials that assist/improve curriculum delivery, and classifies them into six categories which include (Riet, 2015:16-17):

- consumable items, that comprise stationery and textbooks
- non-consumable items, educational materials used over a long period such as three years
- library resources, an information collection that provides research or leisure
- other resources – mostly practical materials such as overhead projector
- e-learning materials, electronic materials associated with digital devices; and
- non-LTSM, items that include photocopier, telephone and computers

LTSM are vital for learning as they offer a context for teaching and learning; teachers and preschool children can refer to specific knowledge and build on that information (Riet, 2015:18). Secondly, the policy on LTSM outline how materials should be used; thus, teachers are guided by the policy document, which enables them to guide the children to use the material successfully (Riet, 2015:18). LTSM enable preschool learners to perform better as it provides context to the content of the lesson and facilitate understanding and guide preschool children to work effectively in a task (Lockheed & Verspoor, 1991). Grossman and Thompson (2008), as well as Mohammad and Kumari (2007), affirm that the successful use of learning materials depends on the way teachers use them; thus, teachers are required to organize and select meaningful materials that can guide, as well as support preschool learners. The



use of LTSM in lessons enable quality education, help preschool learners attain various skills (such as reading and comprehension), and provides physical experiences with materials (Milligan, Koornhof, Sapirec & Tikly, 2019:530-531).

The first difficulty I found with the department policy on LTSM is that it only lists LTSMs for grade R–12; thus preschool children younger than Grade R are not catered for (DBE, 2019). Secondly, the resources included in the LTSM policy, are often textbooks, posters, and teacher guides which require reading and comprehension skills which is not yet part of their learning trajectory (DoE, 2012; DBE, 2019; Mdlungu, 2006; Motloug, 2008). There are no explicit examples of resources or materials that specifically cater for executive function skills during structured play. Most of these LTSM are used inside the classroom and not intended for outdoor play. In my opinion, this gap in the policy can be addressed by discussing LTSM that preschool teachers could utilise during structured play to enhance preschool learners' executive function. With the aim to contribute to knowledge, I included the secondary question – *what resources are utilised to facilitate executive function through structured play?* One of the practical contributions of the study is to share LTSM ideas and examples that preschool teachers can implement during structured play to build executive function skills.

Currently, discrepancies exist regarding the quality and quantity resources used in rural township preschools versus private urban preschools (Adebayo, Ntokozo & Ngema, 2020). This is because the areas where parents can afford to pay higher school fees often also indicate that more developmentally appropriate and versatile materials are provided to children to interact with. Outdoor play in private urban preschools provide water play stands, sandpits, sensory material, swings, and a climbing gym; whilst indoor play includes costumes, paint, building blocks, puzzles, and matching activities (Aubrey, 2017). Contrast to these private schools, many of the children in rural township preschools come from less affluent homes; therefore, the school's funding is often limited to purchasing certain materials (Du Plessis & Mestry, 2019). Aubrey (2017) found that rural township preschools could afford changing toy bags every other month therefore limiting the supply of LEGO® bricks, puzzles, balls as well as toys. This was observed in one of the lessons where a group of children had to share toy bags since the number of play-items proved to be insufficient (Aubrey, 2017). Authors found that a high number of preschool learning centres still struggle to

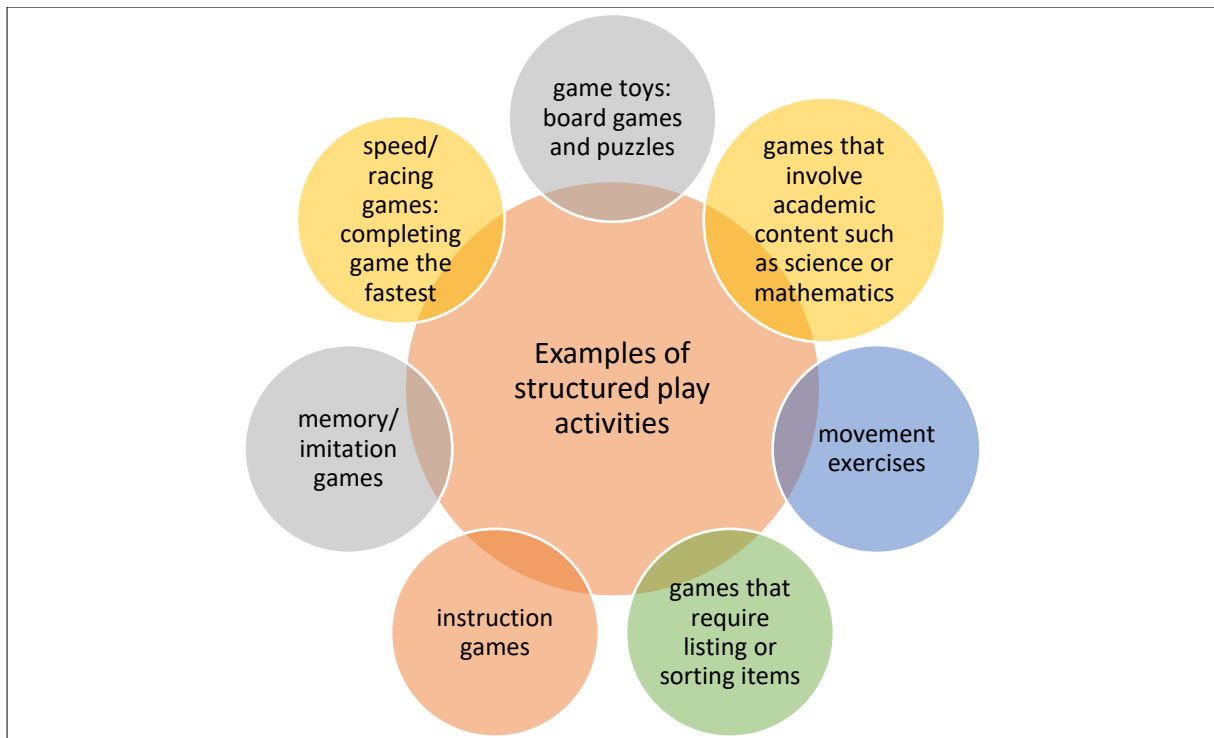


provide resources, as well as play services that could sustain a versatile learning environment (Du Plessis & Mestry, 2019; Giacobazzi, Moonsamy & Mophosho, 2021).

### **2.7.2 Structured play in the early years**

While there are various forms of play such as *free play*, *role play* and *indigenous play* (Dhanapal, Kanapathy & Shan, 2014:272); for the purpose of this study, the following section only discusses structured play. Section 2.7.2 presents an in-depth explanation and analysis of structured play, together with how structured play enables learning and training of executive function in preschool learners.

Murata and Maeda (2002:238) describe structured play as a form of play designed to attain a specific goal. Often directed by an adult, the intentional form of playing and teaching steers the child towards achieving specific outcomes (Bautista et al., 2019:715). Similarly, Murata and Maeda (2002:238) affirm that structured play involves the teacher or instructor having an active role. The instructor gets to determine the learning outcomes, control the use of resources during play, guide the way that children play and steer children towards different tasks with a specific objective in mind (Murata & Maeda, 2002:238). The various activities of structured play strengthen cognitive and physical skills because children get to navigate the play situation by using their physical abilities and to work with different tools (Murata & Maeda, 2002:238). Ultimately, the objective of structured play removes the instructional element of formal learning, and instead, permits children to enjoy attaining new strengths whilst remaining active as they learn (Bautista et al., 2019:716).



*Figure 2.3: Examples of structured play activities*

Structured play enables planning of the play activity, which gives the teacher the opportunity not only to safeguard the setting, but also to ensure that the activity stimulates curiosity, creativity and the engagement of children (Dhanapal et al., 2014:273). Although structured play generally happens within a structured setting, the participants are given the means to discover, construct and categorise their learning activities; according to Muarata and Maeda (2002), this sparks the desire to learn more in order to make sense of the world. Structured play, in essence, enables children to develop and put into practice various thoughts, ideas and skills; understand the value of following rules; take chances; commit errors; develop imagination; communicate with peers and problem solve (Berry, Abernethy & Cote, 2008; Kok, Kong & Bernard-Opitz, 2002).

### **2.7.2.1 The nature of structured play**

Structured play involves two aspects, namely the *environment* within which it takes place (including toys and other resources to promote collaboration); and *adult support* (Weisberg, Hirsh-Pasek, Golinkoff, Kittredge & Klahr, 2016:178). In their planning/structuring of the setting, teachers attain the ability to develop specific methods to achieve learning experience objectives, whilst ensuring that children have the means needed to help them attain the learning outcomes (Berry et al., 2008). An

example of this is board games that allow children the means to learn, interact and have fun (Whitebread, Neale, Jensen, Liu, Solis, Hopkins, Hirsh-Pasek & Zosh, 2017:24). Board games have rules which players are required to follow to achieve a learning outcome. As the means to play are often limited by available resources, this can further stimulate learning in children when they explore various means to succeed in the game by only using the available resources (Whitebread et al., 2017). The second aspect of structured play – adult support – involves adults observing child-led activities and offering comments, suggestions, and reminders to the child of how to attain the learning objective (Weisberg et al., 2016:178). For example, during a board game, the teacher can recap instructions that children might have forgotten or provide clues according to which they can figure out the answer. With adult support, children do not only attain new knowledge, but they can also use the knowledge to further develop newfound ideas (Weisberg et al., 2016:178).

Since structured play is planned and led by adults, Bodrova and Leong (2015:386) warn that there is the danger of the teacher becoming too involved; this may lead to children disengaging from the activities or leaving their work unfinished. Hence, by providing just the right amount of support during structured play, adults/teachers must understand their role as a facilitator who guides preschool learners to achieve specific learning outcomes; the children, however, must take on the main role in their learning (Weisberg et al., 2016:178). Teachers can extend support by demonstrating certain skills which preschool learners can later practice themselves (Weisberg et al., 2016). Moreover, the activities which educators organize for preschool learners ought to be challenging, but not too difficult to achieve (Weisberg et al., 2016). Another vital aspect of structured play involves the fact that the task needs to be age-appropriate since it would be pointless to present an activity that leaves children struggling to complete tasks without adult support, resulting in the instructor/adult having to execute the task/activity (Weisberg et al., 2016).

### **2.7.2.2 Structured play and learning**

Structured play serves as a model that enhances exploratory learning through play (Medina & Sobel, 2019:2). Thus, it fosters the desire to learn and supports child engagement whilst allowing support from the teacher (Medina & Sobel, 2019:2). The play activity constructs an appropriate link between environmental and psychological mediators that assist learning outcomes to be attained (Dhanapal et al., 2014).

Through preschool learners using different resources/learning materials during play, it fosters cognitive flexibility as well as collaboration, being that children are working with various tools and attaining new insights from fellow peers (Dhanapal et al., 2014). Similarly, the support provided through scaffolding, during play activities, can lead children to obtain richer and better learning activities (Dhanapal et al., 2014; Jensen, Pyle, Alaca & Fesseha, 2019:2).

Bearing in mind the learning setting, researchers recommend that structured play needs to give children the opportunities they need to be focused on their learning (Medina & Sobel, 2019:2). More particularly, educators need to provide necessary instructions, centred on play-based learning (Medina & Sobel, 2019:2). Instructions that incorporate play-based learning have been proven to improve preschool learners' academic success and help to improve literacy and counting abilities - further assisting preschool learners to effectively adapt to the formal school setting (Weisberg et al., 2013:105-106). Children get a greater desire to attend school when learning activities appeal to their interests and improves their level of engagement (Weisberg et al., 2013).

Dhanapal et al., (2014) demonstrate ways that structured play helps to attain success in certain subjects. Their work found that structured play improved vocabulary performances as children interacted or engaged during play activities (Dhanapal et al., 2014). According to Dhanapal et al., (2014:272-273), skills are more achievable when children develop the means to express themselves; this is because language skills often guide thought processes. Second to attaining academic success, Dhanapal et al., (2014) note that structured play facilitates problem-solving and analysing situations before taking action. Subjects such as mathematics (and spatial awareness) can be improved through board games that involve counting or that require the child to consider physical actions/spaces; this certainly influences children's mathematical skills (Dhanapal et al., 2014:272-273).

While structured play seems to play a major part in learning how to operate in and adapt to real-life settings; children acquire knowledge better when they are involved in dynamic, productive and cooperative environments; when the knowledge holds significant value; and when the teacher provides various responses, leading preschool learners to further probe the information they have attained (Wood, 2013:24). Hence, in placing preschool learners' interests and needs at the foreground of a learning

experience, structured play provides the necessary learning support, further permitting children to be active participants during learning activities (Wood, 2013:24).

### **2.7.2.3 Role of educators during structured play**

As structured play entails teacher-led activities, the learning activity integrates scaffolding as a way to guide the child gradually towards reaching more advanced outcomes (Jensen, Pyle, Alaca & Fesseha, 2019:2). By doing so, teachers provide indicators, suggestions, examples, and alternatives during the lesson to attain a specific goal (Jensen et al., 2019). During a learning experience, the teacher imparts knowledge, skills and values which are aligned with learning objectives that keeps children focused on achieving the learning objectives (Jensen et al., 2019:3). Although the teacher prompts and initiates play activities, children are still in charge of figuring out how to attain specific objectives with the tools provided; and it is through this form of play that preschool learners, who are given the freedom to do so, can apply different techniques towards achieving the general outcome of a learning experience (Jensen et al., 2019). Loizou (2017:785) states that teachers have various functions and contributions, for example being an onlooker, supervisor, facilitator and, occasionally, a participant. These roles change depending on the needs of the child to achieve success and independent learning. Through this, teachers then strengthen the means to explore and stimulate learning by leading children to discover new ideas, ways (methods) and things (resources) whilst playing alongside them during games and inquire about findings (Weisberg et al., 2013:105). Hence, structured play represents social-constructivism as preschool learners are guided towards achieving specific learning outcomes through interaction with the teacher, peers and the environment (Weisberg et al., 2013:106).

According to Bodrova and Leong (2010:2), there is a “scarcity of research on instructional strategies designed to support play so it can reach its most mature level. The idea is that we need to teach young children how to play is not a new one”. Hence, in line with the findings of Bodrova and Leong (2010), this study, which explores the development of executive function through structured play, hopes to show how scaffolding could be effective in developing executive function skills, as compared to direct teaching. Furthermore, structured play offers an effective informative approach that enables learning to transpire through play as its teaching is rich in knowledge; however, the learning experience still permits play-based learning and discovery

learning through imparting traditional instructions (Hunter et al., 2017). The role of the preschool facilitator is not simply to watch over the child engaged in play, but to observe the activity in order to improve learning experiences, enhance better play techniques, and challenge preschool learners through the course of the learning experience (Hunter et al., 2017). Although literature highlights how structured play equalises learning opportunities between children and adults, its activities should strive to ingrain aspects of free play during its course, as it enables children to practice autonomy and self-regulation (Bodrova & Leong, 2010:2; Hunter et al., 2017:89-90).

#### **2.7.2.4 Challenges and dilemmas of structured play**

There are various obstacles that teachers encounter when introducing structured play activities during a learning experience. Some of these challenges include children finding it difficult to follow certain instructions due to their age, language proficiency and memory, making it difficult to accomplish certain objectives (Jensen et al., 2019:7-8). The matter of maintaining children's attention during activities is also a problem mentioned by teachers when implementing structured play (Jensen et al., 2019). This is particularly so within the early grades, as most younger children cannot sustain their attention on a specific task for longer than ten minutes before losing focus (Jensen et al., 2019). Consequently, researchers advise that teachers develop different tasks with similar objectives for children to partake in so that they remain active whilst rotating among different tasks and so, sustain their level of attention (Dhanapal et al., 2014:279; Jensen et al., 2019).

Another challenge in successfully implementing structured play within classrooms is that this form of play restricts preschool learners' liberty to discover and exert their creative means to explore specific subjects at will (Dhanapal et al., 2014). Furthermore, preschool learners struggle to partner and collaborate with their peers during group work, which could cause them to become disinterested in the task; which could pose a problem as it will impact the group's dynamics and socio-constructive learning opportunities (Dhanapal et al., 2014; Jensen et al., 2019).

#### **2.7.2.5 How structured play promotes executive function**

Research exemplifies how children who engage in structured play demonstrate greater executive function skills, such as inhibitory control, working memory and cognitive flexibility during play activities (Medina & Sobel, 2019:2; Diamond, Burnett,

Thomas & Munro, 2007:318). The Center on the Developing Child (2015) mention various structured games that would improve executive function; these include movement challenges that involve songs and dancing games, as well as yoga exercises, 'freeze' games and balancing. With regard to more quiet games, the Center of the Developing Child (2015) suggests bingo, matching and assorting items, playing with board games and puzzles, or working with different shapes, colours and cards. In the end, the objective of introducing structured play is to gradually move away from adult supervision during play, and to minimise support (Harvard University, 2015:7).

Diamond and Lee (2011:959) also write about learning activities that effectively develop executive function skills; these interventions support the development of executive function as they lessen stressors that would hinder the growth of executive function. The interventions suggested by Diamond and Lee (2011:959) promote pleasure, gratification, self-assurance and focus which represent some of the outcomes of executive function and help facilitate academic success. Like guided play, structured play permits children to remember instructions, plan, resolve the learning task at hand and cooperate with others, which enhances active participation and teamwork (Weisberg et al., 2013:105). The opportunity to participate and work in groups fosters executive function skills (Weisberg et al., 2013:105). By structuring the learning environment in a specific way, structured play assists children to pay attention to pertinent factors, minimises disruption in the classroom and helps to achieve the learning objective – this pertains to enhancing the inhibitory control and attention skills that form part of executive function (Weisberg et al., 2013:105).

Apart from promoting positive results in academic performances, learning activities developed according to structured play have a positive effect on children's socio-emotional skills, which enable emotion control, reduce stress and minimise behavioural problems (inhibitory control is part of executive function) (Weisberg et al., 2016:179). For example, a study uncovered that the Head Start Program<sup>1</sup> enhanced self-regulation skills when participating in structured play activities; the participating learners learnt the means of abiding by the rules, waiting their turn and completing the necessary steps in games (Weisberg et al., 2016:179). Preschool learners who took

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<sup>1</sup> An early childhood education programme established in United States of America; the programme offers health, nourishment and parent involvement services. Funded by its government, the programme enhances school readiness for children living in underprivileged homes (Hagen, Lamb-Parker & Alam, 2019).



part in structured play demonstrated greater strengths in comparison to other preschool learners who received direct instruction and were more capable of overriding, initiating and regulating their impulses (Weisberg et al., 2016:179). Ultimately, structured play helps the child to focus and maintain their momentum towards achieving a goal (Weisberg et al., 2016:179).

To further expand on the concept and context of structured play, the following section explores the conceptual framework which underlies the development executive function skills through structured play.

## **2.8 CONCEPTUAL FRAMEWORK**

According to Adom, Hussein and Agyem (2018:439), a conceptual framework can be understood as a theoretical body that enlightens readers to understand the study's phenomenon. Furthermore, it is based on concepts explored in the research study (Adom et al., 2018:440). A conceptual framework is often a researcher's recreated model that explains the connection between the main concepts (Adom et al., 2018:440). Grant and Osanloo (2014:439) deem a conceptual framework important because "it assists the researcher in identifying and reconstructing his/her worldview on the phenomenon to be investigated", further emphasising the importance of conducting the research topic. For my study, Vygotsky's sociocultural theory (first generation theory) mainly guided my understanding because his theory emphasises learning through social interaction (Bodrova & Leong, 2015:374). The second framework I used is Flavell's metacognitive theory since metacognition works similarly to executive function. The theory helped me to understand why executive function skills are essential for completing tasks, employing self-regulation and attaining academic success (Nazarieh, 2016:61). Taken together the sociocultural theory and the metacognitive theory outline how executive function is developed through internal as well as external support.

### **2.8.1 Vygotsky's sociocultural theory**

A theory developed by the Russian, Lev Vygotsky (1978), sociocultural theory can be understood as the contribution society adds to human development. The theory highlights how people and their environment permit growth (Kozulin, 2003; Lantolf, 2001; Lantolf, 2008). Shabani (2016:2) notes that the theory offers means to understand the mind by evaluating interactions between people, tools, and their



objectives; for the sole reason of people forming and impacting social constructs (Shabani, 2016:2). Some of the contributors to the development of this theory include Alexander Luria, Aleksei Leontiev, Yrjo Engestrom and Michael Cole (Vasileva & Balyasnikova, 2019). According to Lantolf (2008), sociocultural theory derives its tenets from how people interact within an environment to attain necessary cognitive development.

Vygotsky (1978) often spoke about higher mental function (also known as mental tools). The term is synonymous with executive function since it involves cognitive skills that include planning, memorising and the means to self-regulate (Mooney, 2013:111). Bodrova and Leong (2015:373) deem that higher mental functions assist with concentration, therefore, permitting one to learn effectively. Their work marks the difference between lower and higher mental functions (Bodrova & Leong, 2015:373). The following table demonstrates the characteristics between the two types of mental functions.

*Table 2.3: Lower and higher mental functions*

<b>LOWER MENTAL FUNCTIONS</b>	<b>HIGHER MENTAL FUNCTIONS</b>
Sensation	Mediation awareness
Responsive attention	Focused concentration
Impulsive responsive memory	Purposeful memory
Sensorimotor aptitude	Reasoning

When analysed more closely, lower mental functions could be seen as being inborn and subject to the development of a person, whereas higher mental functions are purposeful in actions and decisions (Bodrova & Leong, 2007:19). Secondly, lower mental functions consist of involuntary attention, rote memory, and sensory-motor thought; whereas higher mental functions control the lower mental operations (Bodrova & Leong, 2007:19). The higher mental functions help us to be focused and intentional while disregarding possible distractors; this can be seen when a learner ignores surrounding noises to pay attention to what the teacher is saying during a lesson (Bodrova & Leong, 2007:20).

Sociocultural theory moves away from the previously held belief that higher mental functions originate from biological aspects (Bodrova & Leong, 2007:19). The theory

rather incorporates *culture* as a social aspect that affects the development of a person, therefore helping us to explore and understand human interactions within social settings (Shabani, 2016; Vasileva & Balyasnikova, 2019). Vygotsky's sociocultural theory (1978) aims towards understanding the cultural and historical backgrounds that constitute who people are today (Thomas, 2001:22). The theory explains how people interact with one another, as well as the values considered important within communities, which ultimately determines the nature and functioning of people in their daily lives (van Oers, Wardekker, Elbers & van der Veer, 2008:41; Pramling-Samuelsson & Fleer, 2009:4).

Similar to the sociocultural theory, the activity theory explores how the mind engages with the environment; in other words, exploring how social structures facilitate cognitive development (Edward & Daniels, 2004:107). Daniels (2004:121) found that "in activity theory, it is the activity itself which takes the centre stage in the analysis... this is to theorize and provide methodological tools" on the way people engage with their environment to obtain knowledge. In doing so, the activity theory reveals the process towards achieving an objective, through evaluating factors such as a person's background, their culture, as well as financial means – a relationship between a person, their culture and environment (Daniels, 2004:121; Engestrom, 2000:964). Bakhurst (2009:197), as well as Roth (2004:1) note how the activity theory has noticeably grown. The authors attribute this to the significant impact the activity theory has on learning (Bakhurst, 2009; Roth, 2004). It is for this reason that the activity theory is briefly discussed here to connect how executive function can be enhanced through structured play.

Several scholars reveal the three generations built upon Lev Vygotsky's activity (Antoniadou, 2011; Batiibwe, 2019; Gretschel, Ramugondo & Galvaan, 2015). These are the first, second and third generations of activity theory. According to Antoniadou (2011), each generation is enhanced by the previous one. The first generation was developed by Lev Vygotsky (1978), who is noted as the founding father of the theory. His generation highlighted cognitive development through mediation. The second generation author - Aleksei Leontiev (1978; 1981) - established the basis of the activity theory. Lastly, Yrjo Engeström and Michael Cole are the authors of the third generation theory, which highlights complex systems that affect the means to reach a goal. Table 2.4 outlines all three generations built from Vygotsky's original work.

Table 2.4: The three generations of activity theory

	GENERATION	CONTRIBUTORS	ANALYSIS
1978	<b>First generation</b>	Sociocultural theory <ul style="list-style-type: none"> <li>• Vygotskian Circle or Troika</li> </ul>	The first generation is based on an interaction between the subject and the object. It maintains that, since relationships are not always a straightforward process, mediation through tools and signs (such as culture and language) facilitate the process. Founded on child development, the work argued that human beings are agents, they react to and act upon mediating (Antoniadou, 2011:5; Batiibwe, 2019:4).
1978; 1981	<b>Second generation</b>	Activity theory <ul style="list-style-type: none"> <li>• Leontiev</li> </ul>	The second generation added aspects such as community, rules and labour division. Leontiev stretched the theory of working on the individual, to focusing on a collective activity through incorporating the aspect of community and division of labour into Vygotsky's model, making it more systems based. According to Sannino and Engeström (2018), a community is a cultural group the subjects feature in. Within the group are rules that govern the subjects' actions. The division of labour outline the action and role which subjects share in the system. This means that the second generation takes into account how community, rules and labour division context form an activity system. The activity theory strives to understand how people engage within sociocultural constructs where different bodies have to work collectively. The theory highlights the difference between a person's actions alone, versus what can happen in a joint activity (Sannino & Engeström, 2018:45).
1993	<b>Third generation</b>	Cultural Historical Activity Theory <ul style="list-style-type: none"> <li>• Davydov, Il'enkov, Rubstov, Engeström, Cole, Roth, Daniels, Sannino, Ruckriem</li> </ul>	The third and last generation focuses on multiple interactive activities as it communicates how a single activity system relates to other activity systems. It outlines the differences, similarities and relationships which the systems have with each other. This generation exceeds the single activity system in that it endorses various outlooks, discussions, partnerships and networks within its activity systems. Vygotsky's third generation often redevelops the sociocultural framework so that collaborations and activities continuously form cognitive development (Antoniadou, 2011:109).

This study only relates to the first generation activity theory that speaks to *mediation* through social interactions to attain skills (Antoniadou, 2011:5; Batiibwe, 2019:4). The theory looks at how tools are used in an activity to learn something. With the study exploring the role of structured play in facilitating preschool children's executive function, executive function is then mediated by the teacher using structured play (a tool) to strengthen executive function skills. Structured play provides room for interaction, as well as for engaging with artefacts (play resources) to teach executive function skills (Roth, 2009; Thomas, 2001). The activity of structured play also links with the Zone of Proximal Development, since structured play enables a guided process, as well as the space within which preschool learners can attain executive function skills (Daniels, 2004; Engeström, 2000).

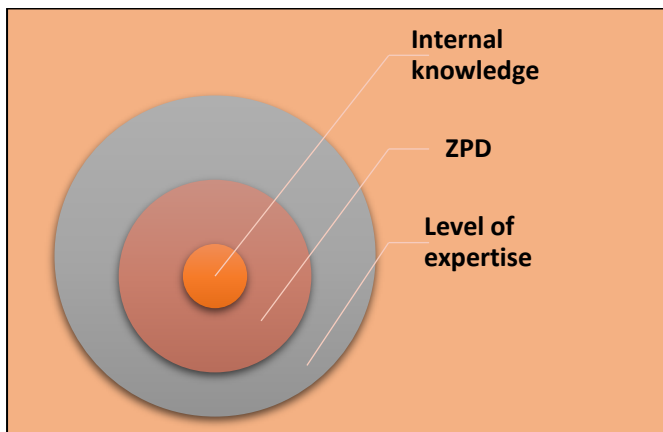
Thomas (2001:159) notes that the process of learning can only occur if a more knowledgeable person – one with greater understanding and advanced level of skill and expert in a specific topic – imparts knowledge to the one trying to learn. The more knowledgeable person offers enough support to permit the child to acquire knowledge and nurture different skills (Shabani, Khatib & Ebadi, 2010:238). Examples of this can be seen in friendships and our surrounding environment; these factors impart various knowledge and skills in children (Shabani et al., 2010:238). Both peers, as well as the environment, provide children with the opportunity to socialise, interact and cooperate, forming close friendships (Shabani et al., 2010:238). Together, the Zone of Proximal Development and scaffolding permit people to acquire necessary skills through social interactions.

### **2.8.1.1 Zone of Proximal Development (ZPD)**

The term Zone of Proximal Development (ZPD) was conceptualised by Lev Vygotsky towards the end of the 1920s (Shabani et al., 2010:238). It was developed after Vygotsky had sought to enhance higher mental operations. The ZPD refers indicates the extent to which children are given guidance and support to achieve an outcome (Bodrova, 2015:376). Literature describes it as the central point of learning where the child can work without the assistance of adults, as opposed to tasks that are too difficult for them to achieve on their own (Joubert, 2016:25; van Oers, Wardekker, Elbers & van der Veer, 2008:15). The ZPD can be understood as the conceptual space between what children can achieve on their own, versus what they can achieve with the

assistance of an adult (Mooney, 2013:101). Knowledge of the ZPD is important to educators because it equips them with the knowledge that the instructional tool facilitates children to be guided, and attain the necessary knowledge and skills (Mooney, 2013:101). Thus, in my study, the ZPD serves to explore how structured play permits teachers to support preschool learners in acquiring executive function and to enable preschool learners to apply the skill on their own.

Vygotsky defined the ZPD as the variation between what a person can do on their own, versus what they are able to do with the help of an expert (Joubert, 2016:24). Hence, children are provided with guidance in contrast to receiving full assistance from a more knowledgeable person. The ZPD focuses on the interaction between an expert (the teacher) and a child; knowledge can only be advanced after interacting with the more knowledgeable person (Joubert, 2016:25). The following figure depicts different spheres applied to the ZPD. The ZPD is better attained through collaboration since it permits people to acquire different skills (Bodrova & Leong, 2007:40-43).



*Figure 2.4: The Zone of Proximal Development*

Thomas (2001:126), states that the ZPD consists of three frames that include the core (knowledge that children have), the second, middle frame constitutes what children still need to learn, and the outermost frame represents those skills that cannot (yet) be attained autonomously. Effective utilisation of the ZPD occurs through social interaction with people who are more proficient and knowledgeable, it includes working with parents, teachers, classmates and even friends to help the child access the area of expertise (Pritchard, 2009:25). ZPD occurs through a process called scaffolding which means that many of the competencies children acquire are learned through

watching as well as mimicking better-skilled persons who model ways to attain a certain skill (Bodrova & Leong, 2015:386; Pritchard, 2009:25).

### 2.8.1.2 Scaffolding

One way that executive function (higher mental skills) can be instilled in preschool learners is through a process termed *scaffolding* (Fleer & van Oers, 2018; Miller-Cotto et al., 2021). Scaffolding can be understood as guidelines and mediations that teachers use to enable preschool learners to master a skill or to internalise knowledge (Nel, Nel & Hugo, 2016:42). In doing so, the teacher develops strategies as a means of guiding preschool learners to attain learning experience objectives; and once the skill/knowledge has been attained, the teacher gradually minimises assisting them (Nel et al., 2016:42). It is worth noting that Vygotsky never stated the word scaffolding. Scaffolding was first introduced by authors such as Gail Ross, David Wood, and Jerome Bruner after engaging with Vygotsky's ZPD in teaching concepts (Azavedo & Jacobson, 2008; Lee & Kolodner, 2011). Scaffolding indicates a more knowledgeable person who supervises and supports a child towards learning new concepts and developing skills. It is a process through which instructors are involved in the planning and arranging of tasks so that preschool learners can complete activities outside out of their knowledge reach (Fleer & van Oers, 2018:48; Miller-Cotto et al., 2021). Figure 2.5 illustrates how scaffolding facilitates ZPD to occur, to help the child to attain a skill.

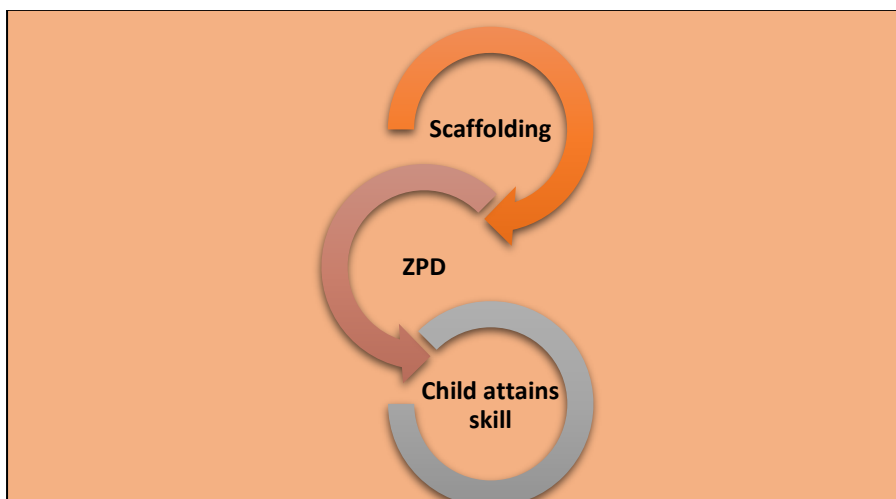


Figure 2.5: Components of Vygotsky's comprehensive framework

Literature notes that scaffolding entails six significant processes where the instructors can support children's cognitive and emotional growth (Fleer & van Oers, 2018:1106;

Miller-Cotto et al., 2021). These are (1) recruitment: here the instructor notes preschool learners' interest in relations to the activity; (2) direction maintenance: instructors need to make sure that children's problem-solving tasks are aimed at meeting specific outcomes; (3) frustration control: it entails dealing and controlling negative emotional reactions in relations to accomplishing tasks); (4) lessening the level of freedom: instructors minimise the number of items needed to meet the outcome; (5) adding essential features during the task: here the instructor adds noticeable features that are imperative or needed to complete the activity; and lastly (6) demonstration: this is where instructors present what needs to be done so that preschool learners can replicate the same actions to complete the task (Fleer & van Oers, 2018:48; Miller-Cotto et al., 2021). By having the necessary cognitive and social support through scaffolding, children ultimately attain the skills that are essential to autonomously carry out tasks.

In relations to the study, the work of Loizou (2017:785), suggests ways in which play can be scaffolded during play activities. The author suggests that teaching techniques can include:

1. Demonstrating the use of items/toys
2. Provide regular, longer play scenarios
3. Endorse the performance of a role for a longer period
4. Ensure children follow the rules during the game

It is essential that during the scaffolding process, teachers provide the necessary support that compliments children's cognitive level so that the work is at a level within which children can function whilst also building opportunities to stretch their minds (Miller-Cotto et al., 2021). This calls for teachers to refrain from answering questions at basic levels but to gradually make the learning tasks more challenging (Miller-Cotto et al., 2021).

### **2.8.2 Flavell's metacognitive theory**

The second theory utilised in this study is Flavell's metacognitive theory. Literature notes John Flavell as the founder of the metacognitive theory (Bryce et al., 2015; Efklides, 2011; Flavell, 1979; Nazarieh, 2015). The theory emerged in 1971 following a solicitation that Flavell had made of sharing additional meta-memory research; the



presentation, however, became the premise of understanding metacognitive studies (Flavell, 1979). Metacognition, according to Hacker, Dunlosky and Graesser (2009:107-108) is interpreted as any type of mental operation that humans experience in the mind. Inspired by Jean Piaget's work, the theory supports people to understand how they learn, as well as developing new meaning from knowledge and experiences (Hacker et al., 2009). Roebbers (2017:33) asserts that metacognition cover facets that supervise and direct cognitive operations. Taken together, a more all-encompassing definition of metacognition surrounds cognitive and emotional activities observed in a person's mind (Pritchard, 2009:27). Flavell (1976:231) distinguished four 'metas' that children progressively attain when working with the collection and storage of information. The four areas consist of (1) metacognitive knowledge, (2) metacognitive experiences, (3) tasks or goals, and (4) strategies which are outlined in Figure 2.6 (Nazarieh, 2016:61).



Figure 2.6: Components of Flavell's metacognitive theory

### 2.8.2.1 Metacognitive knowledge

The primary component of the metacognitive theory is metacognitive knowledge. It is characterised as information that is known or believed, that affects how humans operate (Larkin, 2010:8). Metacognitive knowledge can lead a person to become involved or desert a task depending on his/her interests, strengths, and objectives. According to Weinert and Kluwe (1987:22-23), metacognitive knowledge is divided into *person variables*, *task variables* and *strategy variables*. The *person variable* has to do with the knowledge about how a person thinks or learns and how they think about the way other people think (Larkin, 2010:8). Such examples can be noted through realising the best way a person can learn is through conversation, rather than through reading

or observing a friend (Larkin, 2010:8). Such knowledge of how a person learns could either simplify or hinder their learning performance (Nazarieh, 2016:63). The *task variable* of metacognitive knowledge has to do with all the relevant knowledge about an anticipated activity (Flavell, 1979:907). The information enables the person to determine the level of degree to which he/she will succeed. Task information can come in a great or little form, common or rare form, reliable or unreliable, stimulating or unstimulating, neatly arranged or disorganised (Larkin, 2010:9-10). It mentally notifies the probable outcomes a person can achieve/ will achieve a goal; hence, it outlines the obstacles or necessary tools needed to complete the task. Lastly, *the strategy variable* comprises of determining goals and sub-goals; as well as mentally deciding ways the goals can be attained (Flavell, 1979:907).

### **2.8.2.2 Metacognitive experiences**

Metacognitive experiences refer to the emotional response a person has in relations to a task – the feelings associated with how they perceive themselves engaging in the task (Larkin, 2010:12). The feelings may be brief or extensive, depending on how the task previously transpired and on a person's mindset prior to commencing the task. Hence, one could say that any task completed under pressure incite metacognitive experiences as it triggers an emotional response in a person (Nazarieh, 2016:63). Triumphs or failures, disappointment or fulfilment are some of the emotional responses that affect how a person relates to a task; these emotions can affect people's attention, disposition or readiness to complete a task (Nazarieh, 2016:63).

Weinert and Kluwe (1987:24), provide further explanations of metacognitive experiences. They define metacognitive experience as emotional or mental consciousness that is pertinent to thinking processes. Flavell (1979) describes various examples such as the sense of not comprehending a subject, the sensation that a task could be hard or simple to recall, or the feeling of failing or achieving one's ideas in mind (Larkin, 2010:12). Metacognitive experiences surface in situations where people are called to take action, make decisions or perform tasks. Unfamiliar situations, new events and different outlooks similarly produce metacognitive experiences (Dunlosky & Metcalfe, 2009). This is because certain events have a significant effect on a person, and consequently arouse strong metacognitive experiences. When outcomes hold value, a person will most probably monitor their thoughts and decisions cautiously

(Dunlosky & Metcalfe, 2009). Furthermore, inequalities, different theories and physical or emotional pain are also producers of metacognitive experiences (Weinert & Kluwe, 1987:24)

### **2.8.2.3 Metacognitive goals and tasks**

Metacognitive goals and tasks are the anticipated results or aims of cognitive schemes (Dunlosky & Metcalfe, 2009). These goals and tasks comprise gaining comprehension, constructing ideas, solving problems or progressing in knowledge over a subject. For metacognitive goals and tasks to successfully transpire, it relies both on metacognitive knowledge as well as metacognitive experience (Flavell, 1979:908; Larkin, 2010:9-10; Nazarieh, 2016:63).

### **2.8.2.4 Metacognitive strategies**

The last component of metacognition is known as metacognitive strategies which refer to 'watching' over the cognitive progress (Dunlosky & Metcalfe, 2009). Metacognitive strategies are well-organized procedures that regulate mental activities but also ensure that cognitive objectives (such as solving a sum, writing a sentence, or reading a text) are completed (Jansiewicz, 2008; Nazarieh, 2016). An individual with good metacognitive dexterity and attentiveness uses such skills to manage their learning, arrange and inspect continuous mental activities, and lastly, compare cognitive outcomes with inner or outer criteria (Jansiewicz, 2008; Nazarieh, 2016). Flavell (1979:910) specifies that the type of planning summons cognitive or metacognitive drives, which are aimed at achieving objectives in the cognitive or metacognitive areas. An example of this can be noted when, after reaching the end of a learning experience theme, one tracks how well the content was understood, assesses the level of understanding, or decides to further improve the knowledge that was attained (Flavell, 1976).

Metacognitive strategies are aimed at enhancing awareness of thinking processes while carrying out tasks (Roebbers & Feurer, 2016). It also yields outcomes of executive function such as the working memory; this consists of tracking information stored in one's memory (Bryce et al., 2015; Roebbers, 2017; Roebbers & Feurer, 2016). Metacognitive strategies can be developed through training where their proper use improves learning and work performances. It teaches children the significance of

implementing strategies and monitoring its course. Children who had learnt how to manage their activities were able to successfully apply different strategies, and choose the right technique to attain them (Roebbers, 2017; Roebbers & Feurer, 2016). Those children, however, who lacked metacognitive strategies, struggled to clarify why they selected certain methods or note the difference within various techniques (Jansiewicz, 2008:3). Through applying metacognitive skills, a child would have the means to (1) recognise events in which deliberate, mindful storing of information could be beneficial for the future; (2) learn to retain present information that could enable the means to problem solve and recover when needed, and; (3) thoughtfully and carefully examine information that could be utilised in solving a problem, even when its essence has not been outlined (Dunlosky & Metcalfe, 2009).

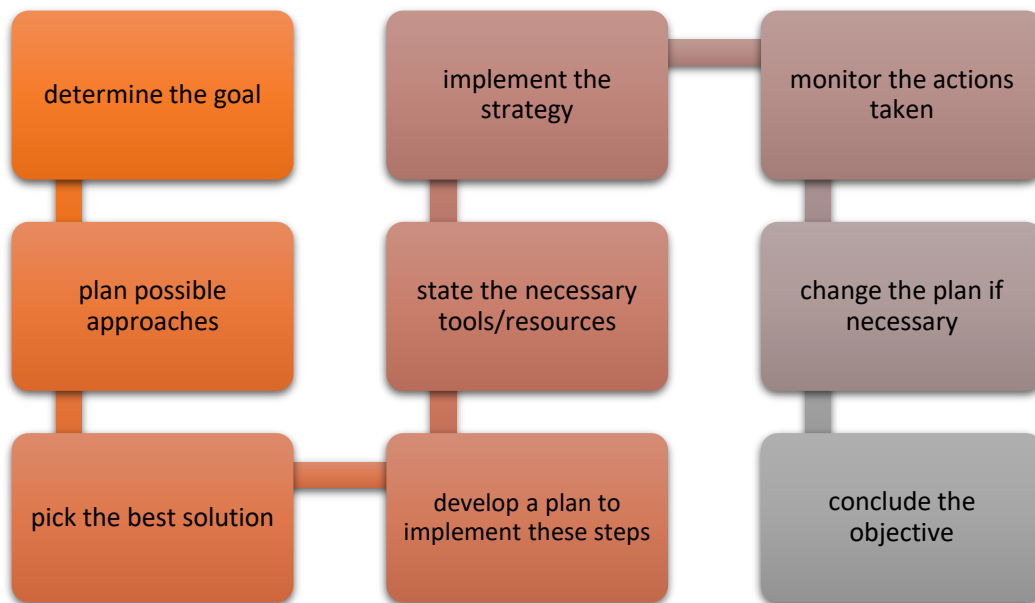
### **2.8.2.5 Growth of metacognitive skills**

One of the most effective ways to attain metacognitive skills is with the Montessori approach (Bryce et al., 2015; Roebbers, 2017; Roebbers & Feurer, 2016). The Montessori learning approach teaches metacognitive skills by directing learning experiences through discovery and experimental learning. Verbal labelling (an additional learning strategy) is an approach for children battling to commence, shift and merge different concepts. The approach comprises finding and labelling the requirements to accomplish a task. The verbal labelling strategy arranges and changes behaviour to achieve desired outcomes (Bryce et al., 2015; Roebbers, 2017; Roebbers & Feurer, 2016). The steps include:

1. Recognizing the problem
2. Determining a plan to achieve the goal
3. Visualise the order of its steps

Given that executive function does not consist of a solitary and simple process, children need to develop skills that help them to organise, assess and prioritise. Consequently, Marlowe (2000:450) developed a model for children that permits them to utilise metacognitive skills when problem-solving. Figure 2.7 illustrates the process of identifying possible steps when performing a task. Children are able to apply different 'metas' such as the metacognitive knowledge, goal and strategy. Once the child becomes accustomed to following a certain pattern, they can then use different

techniques to prevent impulsive behaviour. Figure 2.7 exemplifies a possible systematic guide to develop metacognitive skills.



*Figure 2.7: Model to develop metacognitive skills*

Taken together, the conceptual framework enabled me to comprehend and explain relations and forces of executive function. Since a conceptual framework encompasses theories that mould how a researcher understands the topic of research and how she intends to conduct the study; the conceptual model illustrated how two theoretical frameworks (the sociocultural theory and metacognitive theory) could make sense of teaching and developing executive function skills. Both the theories outlined how executive function is supported by external and internal support (ZPD/scaffolding + metacognitive skill); as seen in Figure 2.8.

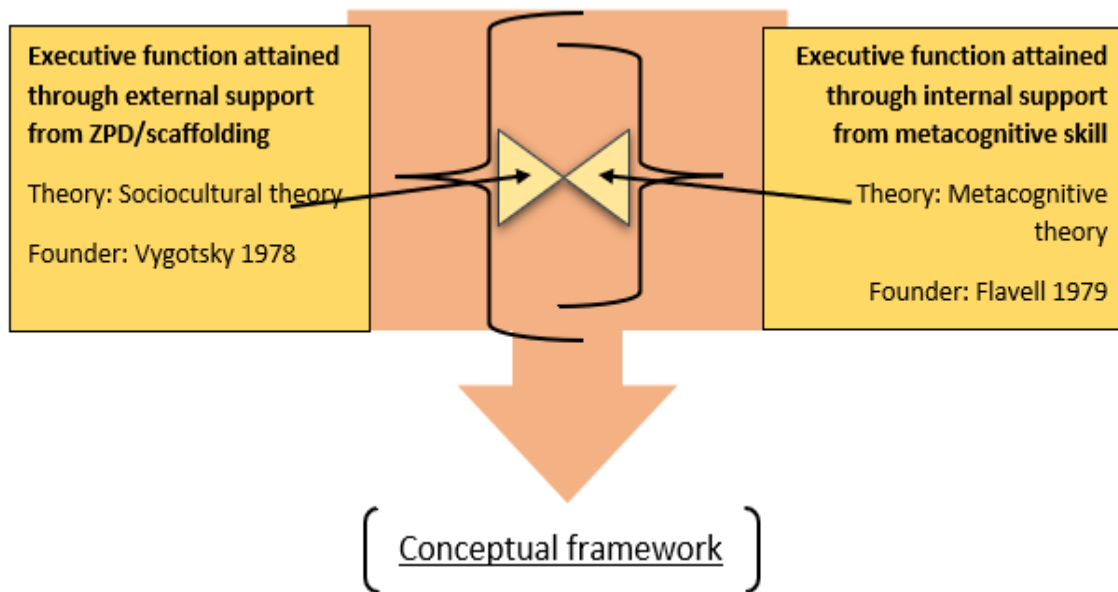


Figure 2.8: Conceptual framework

## 2.9 CHAPTER SUMMARY

This chapter demonstrated various outlooks on executive function, its significance on learning, and the early childhood curriculum followed in South Africa. Information was further provided about early childhood education, both locally as well as internationally; the aim of discussing these different ECE programs was to enlighten how various preschool programs operate across the world. Thirdly, the chapter also provided insight into why play is essential for preschool learning, the nature of structured play, and how structured play enhances executive function skills. Lastly, a conceptual framework was presented to demonstrate ways that executive function can be attained through internal as well as external support. In the next chapter, I outline my research methodology and describe the participants of the study. I also show how I attained trustworthiness and adhered to ethical considerations when collecting my data.

## CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

### 3.1 INTRODUCTION

As stated in the previous chapters, the objective of this study is to explore how preschool teachers facilitate executive function through structured play in preschool children. The chapter summarizes the research methodology applied in the study. Table 3.1 provides an overview of the research methods and processes applied. After presenting a brief detail of the research methodology, the chapter gives a comprehensive account of the research paradigm (see section 3.2), as well as the research approach and design applied in the study. The chapter further describes the sampling technique used to generate the data, as well as the theoretical frameworks and how they relate to data generation. The chapter concludes with a thorough explanation of the data analysis, how trustworthiness was attained and the ethical considerations attended.

*Table 3.1: Overview of the research methods and process*

METHODOLOGICAL FRAMEWORK	METHODOLOGICAL JUSTIFICATIONS	PRACTICAL IMPLICATIONS
<b>Meta-theoretical paradigm</b>	Theoretical framework	Fusion of: <ul style="list-style-type: none"> <li>• Vygotsky's sociocultural theory</li> <li>• Flavell's metacognition theory</li> </ul>
<b>Research paradigm</b>	Socio-constructivism	<ul style="list-style-type: none"> <li>• Ontological assumptions</li> <li>• Epistemological assumptions</li> <li>• Assumptions about human nature</li> <li>• Methodological preferences</li> </ul>
<b>Research approach</b>	Qualitative	<ul style="list-style-type: none"> <li>• Underlying principles</li> </ul>
<b>Research design</b>	Multiple case study	<ul style="list-style-type: none"> <li>• Closed system</li> </ul>
<b>Research strategies</b>	Sample and research site	<ul style="list-style-type: none"> <li>• Non-probability sampling</li> <li>• Specific preschools that applied unique curriculums/approaches</li> </ul>



METHODOLOGICAL FRAMEWORK	METHODOLOGICAL JUSTIFICATIONS	PRACTICAL IMPLICATIONS
	Data generating technique and documentation method	<ul style="list-style-type: none"> <li>• Semi-structured interview</li> <li>• Lesson observations</li> <li>• Document of lesson plans</li> <li>• High quality photographs</li> <li>• Informal field notes.</li> </ul>
	Role of the researcher	<ul style="list-style-type: none"> <li>• Behave honestly and ethically</li> <li>• Safeguard participants and their data</li> <li>• Access the thoughts and feelings of participants</li> <li>• Convey knowledge to the body of scholarship</li> </ul>
<b>Data analysis strategy</b>	Inductive method	<ul style="list-style-type: none"> <li>• Thematic analysis</li> <li>• Single major theme</li> </ul>
<b>Quality assurance</b>	Data verification method	<ul style="list-style-type: none"> <li>• Credibility</li> <li>• Transferability</li> <li>• Dependability</li> <li>• Confirmability</li> </ul>
<b>Ethical considerations</b>	Institutional	<ul style="list-style-type: none"> <li>• Ethical clearance from Faculty of Education</li> <li>• Permission from the GDE</li> </ul>
<b>Research generalisations</b>	Textual	<ul style="list-style-type: none"> <li>• Analytical</li> <li>• Logical</li> </ul>

Sources: Maree (2016) and Nieuwenhuis (2016).

### 3.1.1 Meta-theoretical paradigm

Theory is utilised in qualitative research because such a framework offers clarification about the relationship between the researcher and the phenomenon; thus, it guides a researcher to reflect on the logic behind methodological choices (Collins & Stockton, 2018:1). According to methodological experts Lincoln and Guba (1994), theory-free research does not exist. A theory rather ‘cleanses’ research so that, what has been discovered, can be transferred to other settings, contexts, populations, and possibly periods (Saldaña & Omasta, 2018:257).

“A researcher who cannot articulate a theoretical framework may not have done the difficult and essential work to unearth their deepest operating principles and preconceptions about their study. The belief that preconceived notions do not exist or impact a study is, in fact, a theoretical disposition” (Collins & Stockon, 2018:1).

It is important to note that the theory of method, or the paradigm for this study, is not the same as the meta-theoretical paradigm. A paradigm (e.g. ontology, epistemology) provides guidance to researchers to make informed decisions on which methods will help answer the research questions. Thus, to align what has been indicated in section 3.3 as well as Table 3.1, this study uses the Zone of Proximal Development (ZPD) derived from Vygotsky’s sociocultural theory, as well as Flavell’s metacognitive theory to develop a new theoretical framework. With reference to the central role which a theory plays in a research study, Table 3.2 outlines the principles of the theories and how it was applied in the study.

Table 3.2: Theoretical framework and its influence on the methodological framework

THEORISTS	APPLICATION AND METHODOLOGICAL CONSIDERATION	
	Zone of Proximal Development offers...	Metacognition and executive functioning skills offer...
<ul style="list-style-type: none"> <li>Lev Vygotsky - ZPD</li> <li>John Flavell – Metacognitive theory</li> </ul>	<ul style="list-style-type: none"> <li>This theoretical approach is embedded within a socio-constructivist view on learning which values the role of culture, contexts and social relationship</li> <li>The ZPD guides teachers to identify a situation where <i>if</i> a child cannot do something independently <i>then</i> more knowledgeable others, tools and language can be used to scaffold activities to help the child acquire competencies to be able to do it independently</li> <li>A way to mediate independence is where the teacher gradually gives over control to the child control (e.g. I do, you watch &gt; I do, you help &gt; You do, I help &gt; You do, I watch)</li> </ul>	<ul style="list-style-type: none"> <li>This theoretical approach helps to achieve a behavioural output, where a teacher will help a child utilise his/her prior knowledge to plan a strategy to approach a task</li> <li>Knowledge about metacognition guides teachers to identify a situation where <i>if</i> a child needs to do certain tasks (e.g. manage time, plan, focus attention, handle multiple) then they need to apply specific executive functioning skills to succeed and attain the goal.</li> <li>Thus, the approach offers a way to adapt your thinking and behaviour by drawing on higher-level cognitive skills</li> </ul>
<ul style="list-style-type: none"> <li>Collins &amp; Stockon (2018:1).</li> <li>Saldaña &amp; Omasta, (2018:257).</li> <li>Wolcott (1995).</li> </ul>	THEORETICAL FRAMEWORK: PRINCIPLES	THEORETICAL FRAMEWORK: PRINCIPLES
	<ul style="list-style-type: none"> <li>Offers direction to answer the research questions</li> <li>Assorts various information into groups</li> <li>Surrounds a larger outlook of knowledge and behaviour</li> <li>The knowledge is evident in many people’s lives</li> <li>A critical perspective</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge that forms many other ideas; describes what we know and how we know it</li> <li>Clarifies the knowledge people uphold; this knowledge further determines how the study will acquire its data</li> <li>Foresees the actions people take; outlines the reasons for our actions</li> <li>The knowledge regulates our actions</li> </ul>
	From a data generation and interpretation point of view, the teacher-participant should have:	From a data generation and interpretation point of view, the researcher should:

	<ul style="list-style-type: none"> <li>• Knowledge of the ZPD since it's a learning approach for the young child; similarly, teacher-participant should also develop metacognition as the learning strategy will facilitate executive function skills</li> <li>• Understanding and value of socio-constructivism; will ensure the culture, context and social relationships are utilised to construct knowledge</li> <li>• Expertise in identifying and explaining the logic behind <i>if-then</i> observations, justifying how to plan appropriate mediation activities, and exercising executive function skills as a way to help the child adapt thinking and behaviour</li> <li>• Consulted with knowledgeable others about ZPD activities and executive functioning skills. This will justify participants' cognisance and appropriateness to implement executive function in the learning context</li> <li>• Awareness of children's developmental profile and apply development appropriate actions to co-regulate emotions and interactions during tasks</li> <li>• Individually and collectively fashion cognitive arrangements (thought processes) to ultimately attain an outcome</li> </ul>	<ul style="list-style-type: none"> <li>• Utilise terminology and conceptual explanations for observations; then accurately categorise and label raw data sets</li> <li>• Offer participants different activities to express this phenomenon. This will ensure the data sets are rich, comprehensive and representative</li> <li>• Find ways to obtain evidence of the participants thought processes when explaining and implementing both theories</li> <li>• Draw on scientific literature about how ZPD, metacognition executive function, and play is essential for childhood development. This will offer scientific evidence for the value of fusing the frameworks</li> </ul>
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## 3.2 RESEARCH METHODOLOGY

Research methodology, according to De Vos, Strydom, Fouché, and Delport (2005:71), encapsulate the planning and summary of how a study is conducted. It details the discussion of a research paradigm (see section 3.2), the research approach (see section 3.3), as well as the research type (see section 3.4) to enable one to understand reasons for collecting specific data (De Vos et al., 2005:71). Figure 3.1 demonstrates the course that is usually followed in research methodology.

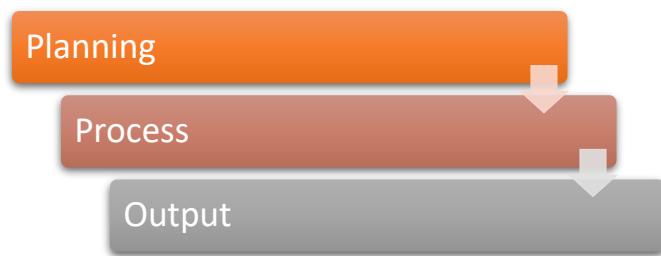


Figure 3.1: The course of a research project (Maree, 2016:60)

## 3.3 RESEARCH PARADIGM

In an attempt to understand the different realities preschool teachers are facing to introduce executive function through structured play, the socio-constructivism lens was applied (further elaborated in 3.3.5). The term ‘research paradigm’ was initially used in reference to a philosophical belief (Given, 2008). According to Given (2008), N.L. Gage conceptualised the term in 1963 to describe opposing beliefs, as well as their approaches. In research, the word ‘paradigm’ is used to define the researcher’s outlook (Denzin & Lincoln, 2011:116; Kivunja & Kuyini, 2017:26). The outlook is a principle, viewpoint, or dogma that sheds light on the various meanings/interpretations of a phenomenon (Nieuwenhuis, 2016:52). Research paradigms innately echo the researcher’s opinions of the environment; these consist of thoughts and beliefs that ultimately mold how a person perceives, construes and operates in the environment (Denzin & Lincoln, 2011:116).

With a research paradigm, researchers get to understand/develop a specific meaning of the research situation (Nieuwenhuis, 2016). Research paradigms are often used to examine the methodological pathway of a study as it determines the necessary steps the researcher ought to take to conduct the study, as well as to examine its data (Bertram & Christiansen, 2016:22). Denzin and Lincoln (2005:21) state that research

paradigms comprise of principles and theories that embody epistemologies, ontologies and methodology – which all work to show how a researcher creates meanings of a phenomenon. The aspects of research paradigms are discussed in the following sections.

### **3.3.1 Ontology**

Ontology can be understood as a view of what people deem as real; this includes various truths, their nature, as well as their essence (Silverman, 2016:9). An ontological view aims to understand reality, its existence, structure, process and how all these relate to each other (Silverman, 2016:9). Ontology poses questions such as: does the reality perceived by role players within a situation stem from the social context or is it personally created? (Kivunja & Kuyini, 2017:27). What is its nature, in other words: is the perceived reality of an objective or subjective nature or is it a lived experience? (Kivunja & Kuyini, 2017:27). Finally, what is the nature of the phenomenon, and does it hold various truths? (Kivunja & Kuyini, 2017:27). For the study, the ontological assumption was based on the participants' constructed realities (Burrell & Morgan, 2017; Gergen, 2012).

### **3.3.2 Epistemology**

The word episteme, originally Greek, signifies 'knowledge' (Bailey, 2018:66). Epistemology explains how we know a subject; its truth and certainty; and anything that amounts to knowledge in the world (Bailey, 2018:66). Epistemology covers the basis of knowledge and the understanding people acquire to widen, spread and deepen various insights (Bailey, 2018:66). Thus, when considering the epistemology of a study, one needs to ask questions, such as: how did the knowledge come to be, and what is the connection between the known and the unknown? (Mertens, 2015:22). The purpose of epistemology is that it permits the researcher to systematically collect data, which results in the development of new knowledge (Mertens, 2015:22).

### **3.3.3 Methodology**

Methodology suggests the research design, research procedures, and the methods utilised in a study aim to discover different or new data (Hesse-Biber & Leavy, 2011:35). It includes aspects such as data collection, participants, instruments and analysis. According to Nieuwenhuis (2016:50), the methodology speaks of the issues and reasons for implementing specific, systematic processes when conducting

research, with the aim to obtain knowledge of the research problem. Methodology ultimately allows people to share their knowledge of the world and how they came to acquire it, by outlining the procedure taken to obtain necessary data (Nieuwenhuis, 2016:50). When considering the actions indicated by the methodology of a study, one needs to carefully consider the forms of collecting data for their relevance; this will permit the researcher to respond to the research question and to access the necessary data to obtain knowledge (Kivunja & Kuyini, 2017:28).

### **3.3.4 Axiology**

Axiology details the value of a study (Denzin & Lincoln, 2011). This is important because the values of a study influence how the study will be conducted. Axiology describes the aims of the study by pointing out why the study is conducted (Dudovskiy, 2018); this is attained when the researcher answers the primary and secondary research questions. Furthermore, Kivunja and Kuyini (2018:28) point out that axiology outlines and provides an understanding of ethical conduct during the study. By answering questions such as “what values will you live by or be guided by as you conduct your research; what ought to be done to respect all participants’ rights; and what are the moral issues and characteristics that need to be considered?” (Kivunja & Kuyini, 2018:28). In doing so, the study can ensure the participants’ rights and values are upheld.

### **3.3.5 Socio-constructivism**

Socio-constructivism (also known as social constructivism) is a paradigm identified in qualitative research being that it explores how people develop meanings (Nieuwenhuis, 2016:121). Similarly, the study looked at clarifying the ideas of developing executive function through structured play. The socio-constructivist paradigm provides the basis for understanding how meanings and interpretations are formed (Lodico, Spaulding & Voegtle, 2010:34) which fits the purpose for the study. In addition, socio-constructivism enabled me to observe the learning experiences, as well as interactions of preschool teachers in their natural setting (Joubert, 2016:21; Lodico et al., 2010:34). This enriches a researcher’s observation as he or she can see how various meanings are constructed and verbal and non-verbal gestures interpreted by the participants in their natural setting. Bertram and Christiansen (2016:26) identify socio-constructivism as real-life investigations when conducting a study; hence, it encapsulates the pursuit to understand the environment within which the participants



work and abide and helps construe personal interpretations of unique experiences. The following points highlight the nature and structure of socio-constructivism (Bertram & Christiansen, 2016:26).

- People construe different meanings and truths
- These meanings and truths are unique in their way
- Meanings and truth can be altered/ modified
- Meanings and truths are formed and not found
- People interacting with their environment construe meanings and truths
- Participants provide information on situations or factors lived

Meanings are often developed from historical and social influences (Bertram & Christiansen, 2016:60). Socio-constructivism refers to the construction of realities by people (Joubert, 2016:21). According to Nieuwnehuis (2016:121) perceptions (also understood as realities) are not merely reproduced, instead shaped through interactions, tradition and cultural customs part of people's lives; hence socio-constructivism surrounds the ability to form knowledge based on the social context. Most constructivist theorists deem that knowledge transpires as soon as people interact with others (Creswell & Creswell, 2018:8; Joubert, 2016:22). Socio-constructivism is focused on the particular context where people operate and reside; this is to comprehend the historical and cultural background of the participants – as opposed to developing a theory, such as post-positivism (see Table 3.2) (Creswell, 2014:8).

Researchers need to bear in mind that their own experiences can affect their interpretation of a situation, since knowledge is the result of personal, cultural, and historical occurrences (Creswell, 2014:8). One of the values of socio-constructivism is that it helps researchers become invested in understanding other peoples' world by investigating the opinions, as well as circumstance of a situation (Creswell, 2014:8).

Although this study employs the socio-constructivist approach, literature highlights various paradigms such as post-positivism, socio-constructivism, transformative and pragmatic to elaborate different interpretative framework and their paradigms. Table 3.3 provides a summary of the various paradigms.

Table 3.3: Interpretive frameworks and associated paradigms

INTERPRETIVIST FRAMEWORK	EPISTEMOLOGY	ONTOLOGY	METHODOLOGY	AXIOLOGY
<b>Post positivism</b>	<ul style="list-style-type: none"> <li>unbiased, objective</li> <li>data obtained through research and statistics</li> <li>limited interaction with participants</li> </ul>	<ul style="list-style-type: none"> <li>single realities can present themselves outside ourselves</li> </ul>	<ul style="list-style-type: none"> <li>quantitative outlook</li> <li>examined</li> <li>consists of intervention</li> </ul>	<ul style="list-style-type: none"> <li>regards privacy and consent</li> <li>there are fair opportunities to participate</li> <li>control biases and prejudices</li> </ul>
<b>Socio-constructivism</b>	<ul style="list-style-type: none"> <li>interaction between participants and researcher</li> <li>values clearly outlined</li> <li>findings are construed between participants and researcher</li> </ul>	<ul style="list-style-type: none"> <li>development of various ideas and meanings</li> <li>obtained through interactions and experiences</li> </ul>	<ul style="list-style-type: none"> <li>qualitative outlook</li> <li>inductive method</li> <li>interviews and observations</li> <li>environmental factors considered</li> </ul>	<ul style="list-style-type: none"> <li>equal interpretation of views</li> <li>communal relationship</li> <li>there is more awareness</li> </ul>
<b>Transformative</b>	<ul style="list-style-type: none"> <li>interaction between participants and researcher</li> <li>various ways of knowing</li> <li>knowledge is based on social and historically factors</li> </ul>	<ul style="list-style-type: none"> <li>opposes cultural relativism</li> <li>values different realities from social settings</li> <li>aware of the consequences of predispositioned truths</li> </ul>	<ul style="list-style-type: none"> <li>historical and contextual factors are outlined especially when concerning oppression</li> <li>mixed methods can be applied (qualitative and quantitative)</li> </ul>	<ul style="list-style-type: none"> <li>tolerance and respect for values, human rights and social justice</li> <li>equality</li> </ul>
<b>Pragmatic</b>	<ul style="list-style-type: none"> <li>what the researcher believes is useful and can be applied</li> </ul>	<ul style="list-style-type: none"> <li>deductive and inductive evidence</li> </ul>	<ul style="list-style-type: none"> <li>research questions and objectives should match the methodology</li> <li>mixed methods can be applied (qualitative and quantitative)</li> </ul>	<ul style="list-style-type: none"> <li>the knowledge obtained is the result of the researcher's values</li> </ul>

Sources: (Creswell, 2014:37; Mertens, 2010:11).

### 3.3.6 Research approach

According to Creswell (2014:3), a research approach refers to the plans and techniques of conducting the study. These include both the broader actions and the meticulous steps that need to be followed in order to generate, examine and interpret data effectively (McMillan & Schumacher, 2014:28). The research approach entails several decisions, such as the method to study a specific topic (the theoretical assumptions conveyed in the study); techniques of investigating the study (considered to be the research type); as well as the research methodology, which includes generating, examining and interpreting data (Creswell, 2014:3). A research design is chosen on the grounds of the research question, the researchers' knowledge, and the audiences of the report (Creswell, 2014:8). Hence, a researcher would have to consider theoretical underpinnings, processes and actions prior to commencing the study. In this study, I utilised a qualitative design as the mode of inquiry to study the phenomenon.

A qualitative approach proved to be the most appropriate research model because it permitted me to study the phenomenon and the selected participants in their natural setting whilst they were constructing knowledge (Lodico et al., 2010:34). Since the study aims to describe preschool teachers' personal experiences, a qualitative research design enabled me to get an understanding of how structured play can facilitate executive function in preschool classrooms. Through this approach, the study provides insight and understanding of the process, patterns and structural features of a play-based learning experience aimed at facilitating executive function. The qualitative data generating techniques included semi-structured interviews, lesson observations, document analysis of lesson plans, high quality photographs and informal field notes to capture data from real lived experiences (Lodico et al., 2010:34). The course of enquiry in a qualitative study comprises addressing research questions and outlining actions to obtain the necessary data, inductively examine the data by interpreting knowledge, and construe new meanings from the overall data (Johnson & Christensen, 2014:33). Table 3.4 outlines the nature of the qualitative study, and how it applies to my study.

Table 3.4: Nature of a qualitative study

QUALITATIVE STUDY	INFERENCES FOR THE STUDY
This approach reflects real-life experiences in that it concentrates on the natural environment where human engagements transpire.	I visited four preschools in the Gauteng area to interview and observe preschool teachers in their working environment. Secondly, preschool learners were observed in their respective classrooms to note how they experience and participate during learning experiences.
Allows the researchers to personally gather detailed information on the phenomenon being explored.	I was able to gather rich data from probing and observing participants in their natural settings. With such information, I stood a better chance of explaining how preschool teachers facilitate executive function through structured play.
Qualitative research enables researchers to gather data and develop theories based on pieces of evidence obtained during the investigation; this is known as a bottom-up approach.	Conducting interviews and observing preschool teachers enabled me to gather new knowledge on the enhancement of executive function through structured play in preschools.
Reveal the thoughts and opinions of participants.	I interviewed preschool teachers to permit the participants to share what they thought executive function and structured play is. This enabled me to hear various perspectives, and collect considerable knowledge/experiences of teachers facilitating executive function through structured play.
The aim is to enlighten and comprehend the subject according to peoples' experiences rather than merely predicting their actions.	I went to the research site to learn and comprehend how preschool teachers facilitate executive function through structured play. This enabled me to further explore the various behaviours within different settings.
The qualitative design consists of extensive narrative accounts.	Eight preschool teachers from four preschools were interviewed and observed; two teachers in each school. During the observations, I sought to identify methods and structures that permitted teachers to facilitate executive function through structured play. In doing so, I observed how preschool teachers connected with the class and how the learners acted in response to the learning experience; this was achieved through various instruments such as interviews, field notes and photographs.
Follows an inductive data analysis process.	I primarily gathered information from interviews, observation and document analysis; this data was then systematised and arranged thematically according to the suggestions provided by Creswell (2002).

(McMillan & Schumacher, 2006:345).

### 3.3.7 Research design

McMillan and Schumacher (2014) describe research design as the process researchers follow when conducting a study to find out *who*, *when* and *how* data are obtained. The process explains matters relating to the preparation and execution of a study (Creswell, 2014). By doing so, the research design outlines how the research will be carried out so that the steps, actions and data generating techniques can help attain the study's overall objective (Gall, Gall & Borg, 2003:433).

Case study as methodology is often applied as a research technique in qualitative studies (Creswell & Creswell, 2018; Denzin & Lincoln, 2011). This is because a case study provides an account of beliefs/understandings people hold. According to Baxter and Jack (2008:545), a case study can be defined as a comprehensive study of people and events for the purpose of understanding reason and patterns of behaviour. It is deemed the most suitable approach to explore unique or newly developed phenomenon (Creswell & Creswell, 2018; Denzin & Lincoln, 2011). While a case study enables researchers to gather a vast amount of information, gather details of uncommon cases, and develop further ideas that can be explored; the cases cannot be generalized or determine the cause and effect of a problem (Baxter & Jack, 2008:545). Table 3.5 outline the types of case studies, alongside the definition.

Table 3.5: Types of case studies

TYPE	DEFINITION	TYPE	DEFINITION
<b>Explanatory</b>	This case looks to answer the 'how' or 'why' questions in a study by examining the cause-and-effect relationships. The explanatory case study is based on real-life situations observed in a particular context (Scholz & Tietje, 2002).	<b>Intrinsic</b>	Looks to understand a particular case as a result of interest. The case could be of interest based on unique or regular traits. With the intrinsic case, the intention is not to develop a theory nor to determine the generic phenomenon (Simons, 2009).
<b>Descriptive</b>	It analyses the order of social events using a theory/model to guide the data collection, for the	<b>Instrumental</b>	The case offers insight into a problem or the hopes of improving a theory. It, therefore, looks into the complexities of the problem with the

TYPE	DEFINITION	TYPE	DEFINITION
	purpose of determining the main phenomena (Scholz & Tietje, 2002).		intention of understanding something else (Simons, 2009).
<b>Exploratory</b>	The exploratory case study seeks to understand the 'what' or 'who' questions to understand the structure of a phenomenon. The case helps develop theories, models, and offer suggestions (Scholz & Tietje, 2002).	<b>Multiple</b>	The approach is applied when several cases are selected to examine the phenomena more in-depth. A multiple case study offers more knowledge than what a single case can provide (Simons, 2009).

Adapted from: (Simons, 2009; Scholz & Tietje, 2002).

From the six types of case studies, the research design that I deemed most suitable for the study was the multiple case study. This is because a multiple case study investigates a topic involving many cases, subjects and participants (McMillan & Schumacher, 2014:371; Stake, 2006:VI). Furthermore, the cases, as well as individuals exist within different settings and the people, events, policies, potencies, difficulties, or interactions are studied in-depth (Thomas, 2011:141). The cases were each studied according to their issues and experiences. Each case has a unique story/meaning to share; however, a common thread rests in the phenomenon experienced in all cases (Nieuwenhuis, 2016). The experiences of cases are unique as they reveal various details experienced by different individuals (Yin, 2014:57). When a study seeks to understand a subject thoroughly, unique cases (multiple cases) are applied to systematically analyse various components of the topic under investigation (Yin, 2014:57).

Hence, the study identified preschools that followed different curricula; this included a Montessori, Reggio Emilia, ISASA and NCF preschool. Eight preschool teachers took part in the study comprising of two participants from each school. A multiple case study approach is particularly suitable for research if there is a minimal or inadequate understanding of a phenomenon (Gall, Gall & Borg, 2003:434). Researchers, in this case, observe, examine documents and conduct interviews to gather information. Therefore, a study must represent various outlooks on activities and problems, portray and determine different opinions (Stake, 2006:VI). Through this approach, I explored the teaching

techniques preschool teachers (teaching the age group of four) applied to develop executive function using structured play.

The limitation of the multiple case study approach lies in the fact that the findings cannot be generalised due to the unique experiences people live – hence, they cannot be applied to everyone else (Lodico et al., 2010:36). According to Leedy and Ormrod (2014:102), as case studies involve an in-depth analysis, the multiple case study approach examines several different cases; this approach is often done through data generating techniques that obtain rich information such as interviews, observations and artefacts. The techniques enable participants to provide their interpretations and meaning using visual or auditory expressions, as well as allow the researcher to experience the detailed accounts first-hand (Maree, 2016:81). This permits the study to become richer in detail and provides clarity in the body of literature where gaps have been identified (Maree, 2016:81).

Although the participants in all of the cases were asked the same questions, what is important to the study were their commonalities, differences and their relationship to gain a better understanding of how the unique cases add value to the subject.

### **3.4 METHODOLOGICAL CONSIDERATIONS**

The methodology entails diverse processes such as identifying the research site and participants (Gall, Gall & Borg, 2003:123). In addition, the research methodology outlines the techniques used to generate the data sets, and then analyse them.

#### **3.4.1 Research participants and sites**

I made use of purposeful sampling to identify suitable participants for the study. In purposive sampling (regularly an aspect of a qualitative study), the participants are chosen based on their knowledge or the possession of a specific trait (Silverman, 2013:148); therefore, the sample is selected for a particular reason. Through this mode, the participants can help answer the research question (Silverman, 2013:148). It is important to note that purposeful sampling does not epitomize the ideas of the larger population because the responses obtained are often subjective as well as biased (Silverman, 2013:148). Purposive sampling is used to access well-informed individuals;



these would be people that have comprehensive information about certain issues due to their occupation, knowledge or experience.

According to Creswell (2014:189), the four areas that include identifying research participants and site include: 1) knowing the location (the place where the research will occur), 2) the participants (people who will be interviewed and observed), 3) the proceedings (what will be asked or observed), and 4) the method (interviews, observation and document analysis). I chose purposive sampling as a sampling technique because it aligns with the qualitative nature of the study and enabled me to target specific individuals for the information I needed (Leedy & Ormrod, 2014:183). Lodico et al., (2010:34) state that purposive sampling works best when the researcher knows who can provide answers to the research questions.

I decided to include four pedagogically different preschools within the Gauteng area as my research sites. The sites included the following approaches: (i) Montessori, (ii) Reggio Emilia, (iii) ISASA and (iv) NCF preschools. My reason for selecting these schools is based on the schools following different learning approaches; secondly, I aimed to compare how executive function is facilitated during structured play in different learning contexts. The study would acquire rich data towards understanding teachers' unique experiences. The participants included eight preschool teachers who were teaching four-year-old children. My reason for focusing on four-year-old children relates to literature (Diamond, 2013:135; Fitzpatrick, 2014:157) deem that executive function rapidly develops around the ages of three to five, and furthermore, that they prepare preschool learners for formal learning (see section 2.3). Other criteria of selecting the participants were based on the grounds that the schools followed English as a medium of instruction; teachers had education training, and the participants were both willing and able to join in the study. Lastly, the data were collected within the different schools' premises as I had full access to the classrooms, resources and learning experiences. Table 3.6 provides an overview of the participants who took part in the study.



Table 3.6: Inclusion and exclusion criteria

PARTICIPANTS AT THE RESEARCH SITE	INCLUSION CRITERIA	EXCLUSION CRITERIA
<ol style="list-style-type: none"> <li>1. Two teachers from Montessori preschool</li> <li>2. Two teachers from Reggio Emilia preschool</li> <li>3. Two teachers from ISASA private preschool</li> <li>4. Two teachers from government preschool</li> </ol>	<ul style="list-style-type: none"> <li>• Teaching age group of 4-year-olds</li> <li>• Teaching at an English preschool</li> <li>• Teachers must have education training; and</li> <li>• Teaching at an NCF, ISASA, Montessori or Reggio Emilia preschool</li> </ul>	<ul style="list-style-type: none"> <li>• Foundation Phase or primary school teachers</li> <li>• Solely Afrikaans speaking school</li> </ul>

### 3.4.2 Data generating techniques

The second element under methodological considerations has to do with how the data was generated, analysed and interpreted (Creswell, 2014:191). According to literature, data generation can be understood as the means of collecting empirical data for one's research (Denzin & Lincoln, 2005:32). As already mentioned, I made use of qualitative data generating techniques that included semi-structured interviews, lesson observations, document analysis of lesson plans, high quality photographs and informal field notes to obtain a richer understanding of how preschool teachers enable executive function through structured play (De Vos et al., 2005:333). Table 3.8 provides an overview of the various techniques applied in the study. Finally, as in any study, it is worth noting the advantages and disadvantages of the techniques applied; to that end, Table 3.7 outlines the advantages, as well as disadvantages, of the data generating techniques found.

The data generation included a pre-elaborative session with the participants summarising what executive function entailed. In this session, I presented the topic executive function using a poster. The poster visually explained what executive function is and gave some examples from the classroom. I then proceeded to interview preschool teachers by asking open-ended questions about the topic through semi-structured interviews. Once the interviews had been done, the teachers scheduled a day where they felt comfortable for me to observe and take photographs of a learning experience they could present. Finally,

a discussion of the learning experience was held to elaborate on the ideas teachers have when planning lessons, about the aspects of their classroom practices and activities that can facilitate executive function through structured play. Preschool children were present in the classroom during observations so that I could observe how learning experiences and learning interactions transpired.

Table 3.7: Research process and data generating techniques at each site

TOPIC	PHASE	ROLES AND RESPONSIBILITIES
<ul style="list-style-type: none"> <li>• Teaching techniques used to facilitate executive function through structured play</li> <li>• Teachers' roles when teaching executive function through structured play</li> <li>• Resources used to facilitate executive function through structured play</li> <li>• The challenges and benefits experienced when facilitating executive function through structured play</li> </ul>	<p>1 HOUR: <b>Semi-structured interviews</b></p>	<p><b>Researcher:</b> An introductory explanation of the purpose of the study is offered and rapport is established with participants. This is followed by an open-ended interview session within a safe environment. If the responses failed to be clear, I probed the participants for further explanation or examples.</p> <p><b>Teacher:</b> Opportunity to converse and reflect on the questions and ask for clarification where needed.</p>
	<p>3 HOURS: <b>Guided observation</b></p>	<p><b>Researcher:</b> Analysing behavioural and play activities to note how the children interact with each other and how teachers scaffold executive function skills through structured play. For this, I used a checklist as a guide to structure and organise what I observed in detail during structured play opportunities. These notes were all added in a journal making them my field notes.</p> <p><b>Teacher:</b> Opportunity to engage and demonstrate her knowledge, skills and perception of this topic with the children in their natural environment.</p>
	<p>3 HOURS: <b>Documents and photographs</b></p>	<p><b>Researcher:</b> Lesson plans were analysed to understand how teachers plan and implement structured play to enhance executive function. I also took photographs of learning activities as well as teaching techniques that facilitated executive function through structured play</p> <p><b>Teacher:</b> Opportunity to engage and demonstrate her knowledge, skills and perception of this topic with the children in their authentic environment.</p>

Table 3.8: Advantages and disadvantages of data generating techniques.

	ADVANTAGES	DISADVANTAGES
<b>Semi-structured interviews</b>	The researcher has a basic structure to help him or her maintain the focus of the study and gather necessary data.	Participants could share what they think is the right answer to please the interviewer. Furthermore, interviewees may provide simple answers to hasten the interview process.
<b>Guided Observations</b>	It details the direct actions of participants according to a predetermined guide, which helps the researcher maintain the focus of the research. Data is noted/recorded as it occurs. Rare details or unexpected events are included - this gives the data more depth.	The researcher could be invasive in participants working spaces. Researchers may also lack the expertise to observe others.
<b>Document</b>	In some cases, documents are easily accessible which spares time when generating information. Documents can be analysed afterwards, in the researcher's own time; no appointments with respondents are necessary making it a very convenient form of data.	This form of data collection does not permit verbal engagements as the document only looks at one area; this limits the researcher in terms of immediate access to informants who could be asked probing questions to clarify aspects of the data contained in the document. Documents can usually only be obtained with permission from the holders.
<b>Photographs</b>	Photographs enable greater input of data by seeing the techniques/resources used during the study. Photographs also permit visual comprehension of the challenges and resources explored in the study.	Photographs concentrate on a single facet of an object. Photographs require elaboration as they can be interpreted differently by different people.
<b>Field notes</b>	Field notes provide added details that could have been missed during interviews and observations. This form of data generating technique also enables the observer to reflect on what transpired during the event, clarifying what worked in the field, versus what did not work.	The observer could miss noticing important details when they are writing details of the event. The observer could also struggle to reach saturation when noting information (it could never be enough).

Sources: (Creswell, 2014:191-192; Marshall & Rossman, 2016:150; Phillippi & Lauderdale, 2018:381).

### **3.4.2.1 Semi-structured interviews**

The structure of semi-structured interviews consists of probing questions where the subject matter and actions are planned (Greeff, 2015:351). According to Creswell et al., (2016:92) interviews enable the participants to discuss what meanings and understandings they have about phenomena. In addition, it provides the platform to describe what the participants understand in their own words. Semi-structured interviews permit researchers to capture specific details during interviews, which then enable meanings and interpretations to emerge (Lodico et al., 2010:124; Leedy & Ormrod, 2014:160). Semi-structured interviews are deemed most suitable for situations where structure and direction are needed from which probing questions can be asked (Harding, 2013:31).

For this study, the interview questions consisted of open-ended questions that permitted participants to reveal their thoughts and views of how they facilitate executive function in preschool children through structured play (see Appendix A). I specifically utilised semi-structured interviews to probe the participants with questions regarding their role in establishing structured play to enhance executive function in their daily programmes. With this instrument, I further aimed to find out about the challenges and the benefits which teachers experience. For this the participants were interviewed face-to-face, one participant at a time, using a voice recorder. Permission was sought prior to each interview (see Appendixes E and F). The interviews were conducted only once with each teacher, in their free time, and took about an hour each to complete. The interview data were later transcribed and examined. Because the term 'executive function' is not commonly known by teachers, I had a pre-elaborative session to inform participants of the meaning of the term 'executive function' (see Appendix I). I then requested the participants to use the information provided, as well as examples to ultimately share their interpretation of executive function. During the interviews, teachers did not identify play as logical consequence when practicing executive function. The participants revealed their general teaching methodology which included structured play.

### **3.4.2.2 Guided observations**

The second data generating technique I utilised was observations. This enabled me to systematically note how structured play facilitated executive function. According to McMillan and Schumacher (2014:374), observation is a form of generating data that

embodies the principle of naturalism: people being studied in their everyday setting without the artificial structure of asking them to take part in an interview or complete a questionnaire. There are two forms of conducting observation – structured and unstructured observation; hence, the study applied structured observation within the framework of non-participant observation (Harding, 2013:21). For my structured observation, I employed explicit rules as to what to record and observe for a specific length of time according to the aims of my research. Similarly, the non-participant observation allowed me to observe the social situation without taking part in the learning experience.

The study observed eight preschool teachers and their learners in their respective classrooms; the children, in this case, were indirectly involved so I could note their responses during learning experiences. Furthermore, I wanted to observe the teachers' classroom practice around executive function through observing the children's responses. The observations occurred after interviews had taken place – once for each of the teachers where the sessions lasted for between 3-5 hours. All observations took place in the participants' classrooms and were conducted according to the observation guide that was developed to structure this part of my research. The guide helped me focus on specific things that I wanted to look for that would give me the information I needed to answer my research questions, as well as identify important issues relating to my topic (Creswell & Poth, 2018:167). I developed two observation guides according to which I could observe both the teachers (see Appendix B) and the children (see Appendix C). The observation guides were verified by my supervisors who are experienced researchers and adept in the field of early childhood education and play. Furthermore, the study adopted observation points from a similar study that analysed the development and training of executive function in kindergarten (Etokabeka, 2018). Lastly, I decided to keep field notes in order to document further information that emerged during the course of observation.

I sat in the classroom to explore the participants' experiences related to developing executive function and note how the children engaged and worked alongside their peers during lesson time. It is important to note that preschool teachers were briefed to use structured play during learning experiences. However, I did not give preschool teachers any information about the kind of structured play games that enhanced executive function skills – the participants were aware that any kind of structured play game

enhanced executive function. This is because during the pre-elaborative session, apart from discussing executive function, structured play was briefly discussed to discuss how it helps develop executive function skills.

### **3.4.2.3 Documents**

The purpose of reviewing documents in a study is to obtain secondary information from sources such as newspapers, letters and diaries (Creswell, 2014:192). While there may be the inclination to assume that all documents are unbiased, it is important to keep in mind that documents are made by people and hence, a researcher can question/examine its legitimacy, reliability and what the material symbolises (McMillan & Schumacher, 2014:386). For this study, eight lesson plans (one from each teacher) were analysed to determine how the learning experiences could enhance executive function through structured play (see Appendix D). It is important to note that there was no specific subject with which structured play had to align with, apart from enhancing executive function. I examined the lesson plan documents to study the teaching approaches, the techniques implemented, as well as identify any similarities or differences in the facilitation of executive function through structured play (Harding, 2013:20-21).

### **3.4.2.4 Photographs of the play environment**

In the study, photographs were utilised as the third instrument to generate data. The photographs that were taken included pictures of the classroom setting, play areas, resources, and learning experience to demonstrate how preschool teachers facilitated executive function through structured play (Stringer, 2014:117). The purpose of this is to provide ideas for readers and other educators to develop executive function through structured play (Harper, 2002:13). In doing so, all necessary precautions were taken to guarantee the individuals who were photographed had given their consent (or in the case of children, their parents had given consent) with the understanding that the photographs would be used in the study but that their identities would remain unknown (see Appendix G and H). The difference between a consent and assent form is that consent is given to participants over 18 years; whereas an assent is a written form for participants younger than 18 years (Harding, 2013:25). The teachers were provided with consent forms, whilst assent forms were specifically designed to simply indicate that the

minor is willing to participate in the study and understands what he or she will be expected to do as part of the study.

#### **3.4.2.5 Field notes**

This type of qualitative observation occurs when an observer reports on the actions and happenings of people being studied; to this end, certain questions guided me in identifying possible actions/reasons for responses (Phillippi & Lauderdale, 2018:318). In this study, the questions that were developed for the semi-structured interview were also utilised in field notes to guide me to identify actions and events that facilitate executive function through structured play. Some of the details that were not mentioned in the observation notes were added in the field notes. I utilised a journal to detail accounts of lesson observations and events.

### **3.5 DATA ANALYSIS**

After gathering the necessary data to answer the research question, literature highlights the need to analyse the acquired information (Creswell, 2014). Hence, data analysis involves the process whereby researchers reduce the data into a comprehensive conclusion in order to gain insight (Bengtsson, 2016). In doing so, it covers the course, as well as the organizing and summarizing of the content and then classifying the information into categories (Cohen et al., 2011). The ability to categorise research data facilitates the means to identify themes and patterns for easy linking (Cohen et al., 2011).

The purpose of analysing the data is to develop meanings from writings and images obtained during the study (Bengtsson, 2016:9; De Vos et al., 2004:335). During analysis, patterns, clusters and themes are formed using a bottom-up approach to arrange the data into a single entity of information. Authors Erisen, Erisen, and Ozekececi-Taner (2013:23) similarly explain that the “systematic, replicable method of inferring meaning” results in smaller categories. This implies that the researcher organises and classifies the data into meaningful codes so that the interpretations can be made in accordance with the literature and the theoretical framework. Erisen et al., (2013:23) note that data analysis can only take place once the empirical data has been attained and validated as reliable before being interpreted.



The method of data analysis applied to the study consisted of inductive analysis. This is because inductive analysis provides the platform from which to understand or explain a phenomenon – executive function through structured play, in this case (Leedy & Ormrod, 2014:18). Given that the inductive technique consists of categorizing themes, it is often associated with thematic analysis since it connects different knowledge or thoughts, contrasts and correlates different aspects of information (Goddard & Melville, 2001:32). The researcher looks at specific details to later develop them into broader themes. I generated all the relevant information from semi-structured interviews, lesson observations, document analysis of lesson plans, high quality photographs and informal field notes. I then proceeded to arrange my data manually by classifying and categorising themes that emerge from the voice recordings and field notes (De Vos et al., 2004:334). The themes explained the participants' responses related to one another, which was significant in forming new knowledge and translations of the data (Harding, 2013:4). According to Harding (2013:4), the thematic analysis consists of three groups, these include:

1. Exploring similarities
2. Exploring variations
3. Exploring relationships

The following diagram demonstrates the process that thoroughly analysed my data.

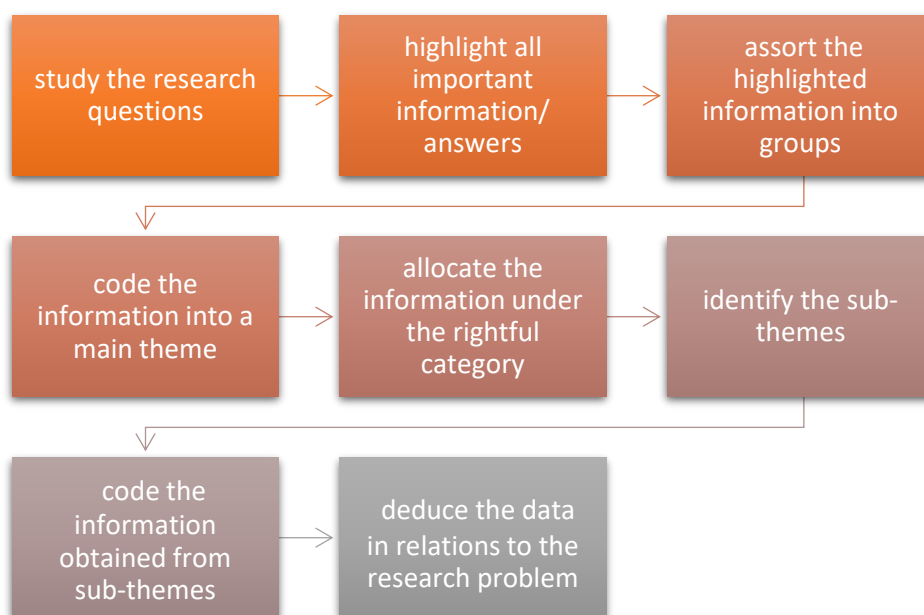


Figure 3.2: The process of data analysis (Kuckartz, 2014:65)

### **3.6 QUALITY CRITERIA**

Trustworthiness, as overarching quality criteria, can be understood as the process that ensures a study applies diligence and transparency in its research findings (Creswell, 2014). Trustworthiness verifies whether the discoveries and verdicts are true (Elo, Kääriäinen, Kanste, Pölkki, Utriainen & Kyngäs, 2014:1). Hence, to ascertain that trustworthiness was applied in the study, I utilised different data generating techniques and applied a multiple case study approach to study each unique case. Since literature suggests that trustworthiness consists of credibility, transferability, dependability and confirmability (Creswell, 2014:201); these four aspects are discussed and I describe how they were applied to my study.

#### **3.6.1 Credibility**

Credibility is the assurance of truth found in research results and provides the means to prove that the study is original and that it occurred (Maree, 2016:373). Credibility is also used to determine if the research results align what the primary data (which is the actual interpretation of the participants' responses) (Bengtsson, 2016:12). Similarly, McMillan and Schumacher (2006:471) interpret credibility as “the extent to which the results of a study approximate reality and are thus judged to be trustworthy and reasonable”. For this to occur, researchers need to conduct a thorough investigation that applies various credibility sources (McMillan & Schumacher, 2014:354). These can include lengthy and diverse field experiences consisting of triangulation, member checking, peer examination, having prolonged engagements and providing a ‘thick’ description (Anney, 2014:276; McMillan & Schumacher, 2014:354).

Firstly, triangulation can be understood as the use of different data generating techniques to provide authenticity (Elo et al., 2014:2). It also permits different data sources to contribute more in-depth information about the research situation (Elo et al., 2014:2). The purpose of using triangulation is to validate that the information obtained from different data generating techniques is indeed true and that they align with one another (Elo et al., 2014:2). Thus, the study applied various data generating techniques that include semi-structured interviews, observation, documents and field notes; these were all employed to observe and examine the research question from different angles that could be aligned with each other. I analysed to see if similar results could be identified using these different sources. Hence, after transcribing all the interviews of the study, participants were provided with the opportunity to check the information

transcribed. This was done so that participants could check that the written information is true to what they intended it to be.

Secondly, member checking can be understood as the process that permits the participants to verify if the information transcribed from interviews is true and not fabricated (Carpenter & Suto, 2008:153). This further permits any misinterpretations to be corrected, as well as to clarify details that could have been left out. I employed peer examination which refers to peers/colleagues who are indirectly involved in the study but who have an overall understanding of the study, enabling them to verify all the data that was gathered in the study (Liamputtonng, 2013:33). I also sought assistance from my supervisors and fellow postgraduate students to read and analyse my transcriptions and field notes to confirm a connection between codes, themes and grouping from the data. This was done to authenticate the information obtained in the study. Hence, to ensure the means of transferability in the study, I kept all the constituents and items used to obtain my research data (these included voice recorders, transcriptions and field notes). These items were later used to provide a comprehensive account of the setting, activities and events that transpired during the study. Full descriptions of the study are a vital technique for transferability, not intending to imitate the study, but instead, share participants' truths and experiences so that readers can employ what is useful to them.

Thirdly, in relations to prolonged engagements in the study, all participants were provided with a briefing session prior to the semi-structured interviews (Lincoln & Guba, 1985: 260). The purpose of this was to explain the context of the topic. In doing so, the participants were offered the chance to ask or clarify terms that were not clearly understood (Anney, 2014:276). Likewise, the thick descriptions during semi-structured interviews enabled the participants to provide in-depth detail of explanations, examples and opinions (Lincoln & Guba, 1985: 260).

### **3.6.2 Transferability**

Transferability validates the extent to which the findings of the qualitative study can be applied to different contexts with other persons – it is the explanatory means of generalizing information (Stringer, 2014:94). Generalising information to other populations was limited in this case as this is usually not possible with a qualitative study, such as this. However, it was used to enable the means for readers to adopt similar actions in finding the solution to a problem (Anney, 2014:277). Literature

suggests that the two ways transferability can be attained are through providing detailed descriptions and applying purposeful sampling (Anney, 2014; Bengtsson, 2016). Detailed transcriptions offer a comprehensive account of the study (through various data generating techniques), whereas purposeful sampling outlines the nature and traits of the participants and site specifically chosen for the study (Bengtsson, 2016). This is done so that the same results obtained from one group can be applied, just as well, with other people (Bengtsson, 2016:13). Thus, the study utilised purposeful sampling to outline the criteria of participants in my study. This enabled readers to know which similar people, contexts and events can facilitate executive function through structured play.

### **3.6.3 Dependability**

Dependability addresses the constancy of results after a while and that the information obtained can be relied upon (Creswell, 2014). In other words, should the study be imitated in future, the outcome/results should be somewhat the same (Creswell, 2014:201). Dependability also refers to people who review the data generated and sometimes add further suggestions (Yin, 2016:161). In this way, readers can be assured that the re-evaluation of data was approved. The elements that normally ensure dependability consist of triangulation, member checking, peer examination and audit trail to corroborate the information obtained (Anney, 2014:278). An audit trail can be understood as a stepwise replica that details the methodology used in a study; its purpose is to allow for replication of the actions that occurred. Thus, the study made use of the four elements listed above. My intentions with applying triangulation, member checking, peer examination, as well as the audit trail were to enable the constancy of findings and techniques taken to obtain the results.

### **3.6.4 Confirmability**

Confirmability refers to the extent to which the findings of a study can be confirmed by others (Yin, 2014:57). Secondly, it refers to data that is not fabricated, but obtained (Anney, 2014:279). Thus, the data that is found should be in every way objective and support the findings of the study (Anney, 2014:279). Literature suggests that confirmability can be attained in a qualitative study through conducting an audit trial to detail how the outcomes of the study were obtained; writing in a reflective journal to reflect on personal opinions, sentiments and ideas; and lastly, carrying out triangulation

(Anney, 2014:279; Stringer, 2014:94). An audit trail was applied in the study to provide evidence of what transpired during data generation. I also utilised a reflective journal to expose any preconceptions and to enable me to acknowledge any prejudices carried (Creswell, 2014:188). Bengtsson (2016:8) validates the importance of deliberating our knowledge as it lessens the possibility of being biased in a study. Lastly, the evidence of recordkeeping together with data interpretation was provided; this permitted me to account how the meaning and findings of the study were construed (Noble & Smith, 2015:35).

A summary in relations to Tracy and Hinrichs (2017:3-4) “big-tent criteria” determines how the quality assurance was attained is presented in Table 3.9.

*Table 3.9: An overview of quality assurance*

<b>QUALITY CRITERIA</b>	<b>MEASURE EMPLOYED</b>	<b>QUALITY CRITERIA</b>	<b>MEASURE EMPLOYED</b>
<b>Deserving topic</b>	<ul style="list-style-type: none"> <li>• Admissible</li> <li>• Timely</li> <li>• Meaningful</li> <li>• Interesting</li> </ul>	<b>Methodological rigour</b>	<ul style="list-style-type: none"> <li>• Concept clarification</li> <li>• Data and field periods</li> <li>• Representation(s)</li> <li>• Frame(s) of reference</li> </ul>
<b>Candour and honesty</b>	<ul style="list-style-type: none"> <li>• Cognisance of personal beliefs, biases and predisposition</li> <li>• Transparency about the methods and limitations</li> </ul>	<b>Plausibility and credibility</b>	<ul style="list-style-type: none"> <li>• Rich description, specific detail</li> <li>• Cultural and non-textual awareness and sensitivity</li> <li>• Triangulation</li> <li>• Susceptible to interpretation thus the importance of theoretical framework</li> <li>• Continuous self-reflection</li> </ul>
<b>Rapport and relationship</b>	<ul style="list-style-type: none"> <li>• Awareness of wider audience</li> <li>• Discerning, suggestive representation</li> <li>• Real-life generalisations</li> <li>• Transferable conclusions</li> </ul>	<b>Substantive input</b>	<ul style="list-style-type: none"> <li>• Theoretical grounds</li> <li>• Practical standpoint</li> <li>• Moral and ethical</li> <li>• Sound Methodology</li> <li>• Problem-solving</li> </ul>

<b>Ethically sound</b>	<ul style="list-style-type: none"> <li>• Ethical process</li> <li>• Operational environment and ethics related to culture</li> <li>• Ethics situated in relationship</li> <li>• Outgoing ethics (exiting the study and distributing the research)</li> </ul>	<b>Purposeful consistency</b>	<ul style="list-style-type: none"> <li>• Attained what was proposed</li> <li>• suitable and scientific processes</li> <li>• Constructively linked bibliographical material, research</li> <li>• inquiries, findings, and portrayal with each other</li> </ul>
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### 3.7 ETHICAL CONSIDERATIONS

As research involves studying a phenomenon, human interactions become a customary source where information can be obtained (Lodico et al., 2010). Ethical consideration consists of outlining, assessing, and comprehending notions of right and wrong actions concerning study; hence, it considers the correct decisions researchers make with people (Sliverman, 2013:161). Ethical consideration is important because it guides researchers to be professional, responsible, respectful and cautious when obtaining information or working with the participants (Lodico et al., 2010:17). In addition, they regulate and apply principles that prevent the participants from doing anything outside their own will (Flick, Von Kardorff & Steinke, 2004:334). Flick et al. (2004:334) note that to safeguard both the researcher and the participants during such events, researchers should take note of various ethical protocols that manage its operation; these include:

1. Writing or verbally outlining the purpose of the study so that participants comprehend how the information will be utilised
2. Having a written authorization to share information in the study
3. Informing participants of the data generating techniques and when they will occur
4. Giving the exact transcriptions, interpretations and findings to participants
5. Prioritising participants' rights and safeties when writing a report
6. Obtaining the decision surrounding participants' anonymity (Creswell, 2014:95).

### 3.7.1 Informed consent

Since a researcher is responsible for defending the rights, principles, requests and desires of participants; the study ought to ensure consent is obtained from the participants (Silverman, 2013:161). Informed consent refers to people's right to liberty in making choices about their participation in research based on the researcher disclosing, in full, the intent and purpose of the research study (Flick et al., 2004:334; Hamilton & Corbett-Whittier, 2013:67; Mukherji & Albon, 2010:37). Similarly, Harding (2013:25) describe informed consent as written accords the participants give to partake in the study without any coercion. It entails people deciding if they would like to involve themselves in a study or not, after learning what the study is about (Harding, 2013). Researchers need to seek the participants' permission prior to collecting information; therefore, the participants are only interviewed and observed after having given their permission (Harding, 2013:25). Table 3.10 outlines all the criteria to ensure informed consent.

*Table 3.10: Ensuring informed consent*

<b>CRITERIA OF INFORMED CONSENT:</b>	<b>THE IMPLICATION FOR THE STUDY:</b>
<b>Competence</b>	I included responsible and capable people who could make the right choices if provided with the necessary knowledge of the study.
<b>Voluntarism</b>	Consent forms stated and provided the choice if the schools' participants and caregivers wanted to participate in the study (through permission slips). Furthermore, the parties involved had the right to withdraw at any time without any prejudice.
<b>Full information</b>	Consent forms provided the necessary details of the study. This includes how I - the researcher, would conduct the study, reasons for conducting the study, the benefits of participating in the study and the final output of the research information.
<b>Comprehension</b>	Guarantee that participants and involved parties understood the nature of the study; the consent letters profusely outlined what, how and why the study would be conducted.
<b>Permission</b>	Principals, teachers, caregivers and preschool learners were provided with consent forms (assent for preschool learners).

Sources: (Harding, 2013:25).



### **3.7.2 Confidentiality and pseudonyms**

Confidentiality is the account of how the data will be utilised, the people who will possess its asset and how the data can be retrieved (Creswell, 2014:96). In this case, I sought to assure the participants that the only people who would come into contact with the data are the members of the research team. Furthermore, all information gathered from the study would be locked away and protected when it would no longer be utilised (Harding, 2013:26). Anonymity means that readers do not know, and cannot identify the people who are sharing information in the study (Yin, 2016:280). The identities are protected so that no person reading the outcome is capable of recognizing which person shared what opinion (Harding, 2013:26).

### **3.7.3 No harm or risk to participants**

I ensured the safety of participants throughout the study (Creswell, 2014; Silverman, 2013) and no harm befell participants. Participants only gave their opinion about the topic; I did not interfere in the situation during the course of the study in any way that could have caused possible harm. Secondly, all interviews and lesson observation occurred on school premises, enabling the participants to interact within an environment that they were familiar with and felt safe in. Some of the risks involved included:

- Participants feeling self-conscious or anxious to present lessons while I observed. Therefore, I had a brief contact session with the participants to inform them what the study would be about, get a general sense of daily routines and learning atmosphere for the purpose of getting to know the participants and building trust.
- The participants feeling stressed that a lesson might show them as less than competent as a teacher. Teachers were given the opportunity to set a date and/or reschedule the lesson observation for a day and time that they felt comfortable with. I reassured teachers that the purpose of the study was not to judge their teaching styles, but rather to learn from their expertise and their individual ways of engaging with learners.
- The participants feeling uncomfortable expressing themselves in a language which they are comfortable communicating in All participants were approached beforehand and asked if they felt comfortable expressing themselves in English.



Signing the consent form stipulated teachers' agreement to proceed to teach their lessons in English.

In essence, ethics attends to the following question: what surrounds moral behaviour when conducting a study? For this study, I began my ethics approach by applying for ethical clearance from the University of Pretoria's Faculty of Education Research Committee, to ensure that all regulations and procedures are adhered to. Secondly, I sought to obtain consent in the form of consent forms, from the DBE, principals, teachers and legal guardian/parents of learners in the class (see Appendix G, H and J). The overall process of applying ethical considerations is noted in Table 3.11, which also shows at which point of the research each step was taken.

*Table 3.11: Ethical considerations*

<b>POINT IN RESEARCH PROCESS</b>	<b>DESCRIPTION</b>
<b>Before the study</b>	<ul style="list-style-type: none"> <li>• Identified a research problem that speaks to the reality of participants</li> <li>• Obtained ethical clearance and a certificate from the University's ethics committee</li> <li>• Obtained approval from DBE</li> <li>• Identify possible preschools to conduct research therein</li> </ul>
<b>At the start of the study</b>	<ul style="list-style-type: none"> <li>• Approach the intended preschools</li> <li>• Explained the objective of the study</li> <li>• Determine the disposition of teachers and preschool learners to participate in the study</li> <li>• Provided letters of consent to school, participants and caregivers</li> <li>• Voluntary participation was respected</li> <li>• Schedule a date for interviews and lesson observation</li> </ul>
<b>Data generation phase</b>	<ul style="list-style-type: none"> <li>• Respect the research site and did not disturb the surroundings</li> <li>• Treated all participants with respect and integrity</li> <li>• Whilst observing, kept personal influencing capabilities in mind</li> <li>• Did not manipulate, exploit or use participants for my own benefit</li> <li>• Refrained from generating information that could harm participants</li> </ul>
<b>Data analysis phase</b>	<ul style="list-style-type: none"> <li>• Remained objective during analysis, revisiting my own assumptions to remain impartial</li> <li>• Abstained from revealing only positive or only negative findings</li> </ul>

	<ul style="list-style-type: none"> <li>• Held the privacy and anonymity of participants in the highest confidentiality</li> </ul>
<b>Reporting, disseminating and storing data sets</b>	<ul style="list-style-type: none"> <li>• Did not commit plagiarism, forge writing, or fabricate data, proof, findings and conclusions</li> <li>• Did not disseminate incriminating or maleficent information</li> <li>• Used unambiguous and appropriate written and verbal language</li> <li>• Made data sets available for inspection</li> <li>• Retain original data sets in a safe place as prescribed by the University of Pretoria</li> <li>• Did not replicate any publication, even in partial stages</li> </ul>

Sources: (Creswell & Plano Clark, 2018).

### 3.8 CHAPTER SUMMARY

Chapter 3 explained and discussed the research methodology that would be applied to this study. In doing so, the chapter commenced with outlining components of a research paradigm which was later used to discuss the socio-constructivism, research approach and the research type that consists of a qualitative design and multiple case study approach. Purposeful sampling was utilised to select relevant participants from different preschools within Gauteng province where data generating techniques included semi-structured interviews, lesson observations, document analysis of lesson plans, high quality photographs and informal field notes to ultimately speak to the theoretical frameworks. The chapter proceeded to confer data analysis through the means of induction analysis and concluded with a detailed account of how trustworthiness was ensured and ethical considerations dealt with. In the next chapter, I present the data and outline the findings of preschool teachers facilitating executive function through structured play in preschool children from which I make possible recommendations.

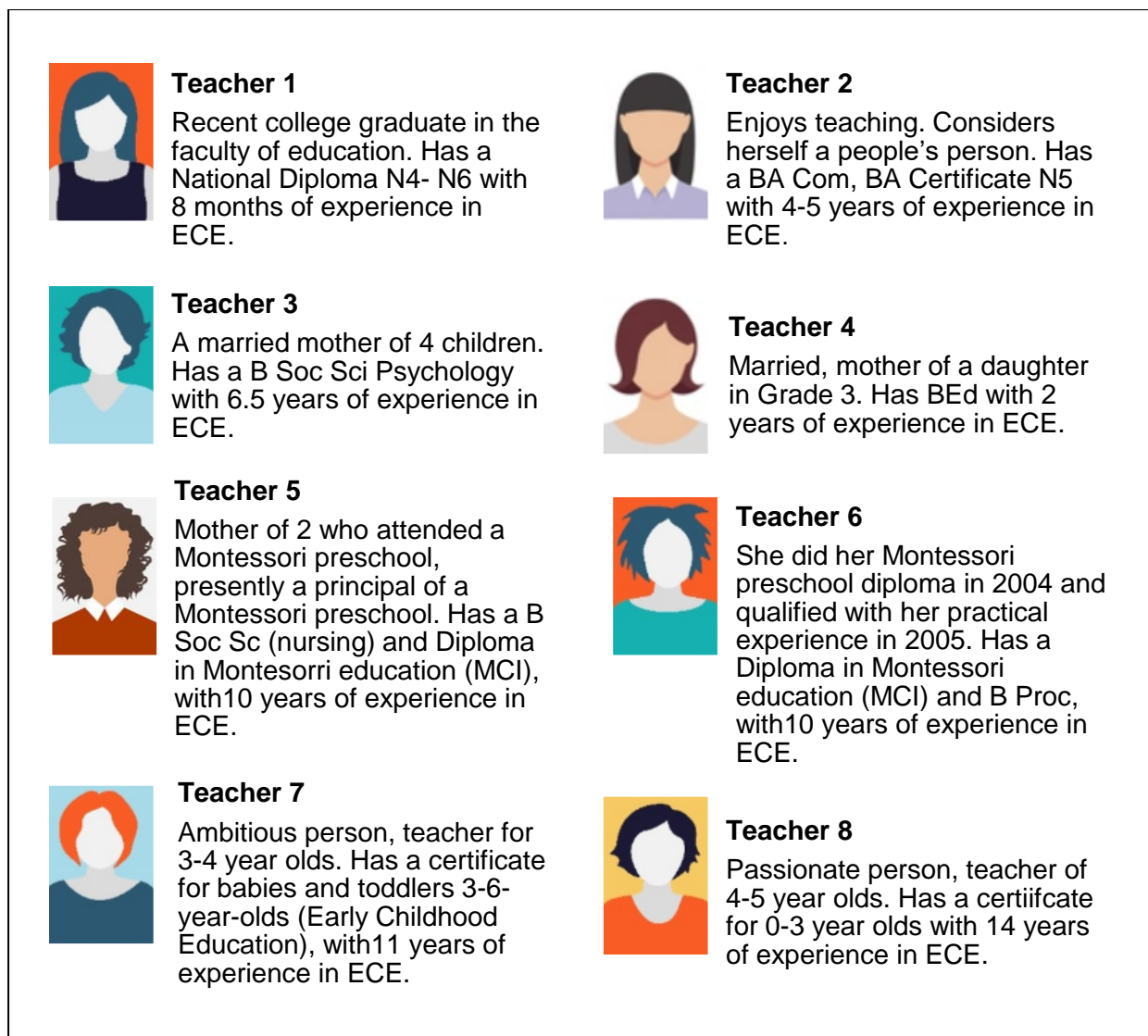
## **CHAPTER 4: DATA ANALYSIS AND INTERPRETATION**

### **4.1 INTRODUCTION**

Chapter 3 presented the research design and data collection instruments used to generate information for the study. I sought the appropriate methodology to comprehend how structured play could facilitate preschool learners' executive function processes. The data were obtained through interviews, lesson observations and document analysis. This chapter commences with a brief description of the participants, followed by an analysis of data generation strategies. The chapter then details how the generated data was analysed by examining the responses to interviews, lesson observations and the document analysis of lesson plans. The results are presented according to a theme and sub-themes embodying the interpretation of the data. The chapter concludes with a brief summary.





### **4.2 PARTICIPANTS AND RESEARCH SITES**

Chapter 3 gave an in-depth description of the teachers and schools involved in the study (see section 3.4.1). Figure 4.1 presents details of the participants' interests, qualifications, and years of experience.



*Figure 4.1: Description of the participants*

Figure 4.2 provides background knowledge and a description of the school. The purpose was to elaborate on the kinds of schools I approached to interview, as well as observe. This would provide an understanding of the kind of teaching and learning of the schools.

	<p><b>School 1</b></p> <p>School situated in Pretoria with children from the age of 3 months – 6 years. The school is both an English and Afrikaans medium school. The school currently has 40 children enrolled and sports is outsourced. Families earn between medium to high levelled income. The school follows the NCF curriculum, where the language of instructions consists of English and Afrikaans.</p>		<p><b>School 2</b></p> <p>English medium Catholic school that has preschool to grade 12 classes. The school has various sports fields, as well as a chapel on the premisis. Many children speak Sesotho as a home language. The school is currently implementing ISASA suggested methods. Families earn between medium to high levelled income.</p>
	<p><b>School 3</b></p> <p>Montessori environment, where English is the language of instruction. Children come from a range of socio-economic backgrounds. The school is also a training and learning facility for teachers in training. The classrooms have various learning equipment inside classrooms and outside the garden area. Children all study and interact together.</p>		<p><b>School 4</b></p> <p>The philosophy behind this Reggio school is based on Loris Malaguzzi's belief and Howard Gardner's theory of multiple intelligences. This is a school where every child is considered to be gifted. The language of instruction consists of English and Afrikaans.</p>

*Figure 4.2: Description of the schools*

### 4.3 CODING OF PARTICIPANTS AND RESEARCH SITES

In protecting the identities of the participants, the names of teachers, children and schools were labelled as codes. The schools, for example, were coded as S1, S2, S3 and S4; whereas the participants were coded as T1, T2 etc. During transcription, any name uttered during the interviews was substituted with a pseudonym. Table 4.1 presents all the codes used for participants and the schools.

Table 4.1: Data codes of participants

Curriculum / approach	School code	Participants	Transcription code	Observation of teacher	Observation of preschool learners	Document analysis
NCF	S1	Teacher 1	T1	TO1	LO1 (17 learners)	DA1
		Teacher 2	T2	TO2	LO2 (14 learners)	DA2
ISASA	S2	Teacher 3	T3	TO3	LO3 (22 learners)	DA3
		Teacher 4	T4	TO4	LO4 (21 learners)	DA4
Montessori	S3	Teacher 5	T5	TO5	LO5 (26 learners)	DA5
		Teacher 6	T6	TO6	LO6 (25 learners)	DA6
Reggio Emilia	S4	Teacher 7	T7	TO7	LO7 (9 learners)	DA7
		Teacher 8	T8	TO8	LO8 (8 learners)	DA8

#### 4.4 DATA ANALYSIS

Corbin and Strauss (2015:81) explain data analysis as “the act of interpreting data for meaning”. Interpreting data, in this case, suggests the ability to individually inspect the data of the study (Harding, 2013:4). De Vos et al., (2005:339) further clarify that data analysis is a structured process of organising data with the hopes to obtain meaning from the information. I followed the process of examining semi-structured interviews, observations, documents and field notes to identify similar concepts. Concepts are important because they enable me to develop meaning and ultimately answer the research question (Corbin & Strauss, 2015:68). Concepts are considered sub-themes in the context of this study; they were grouped and discussed accordingly. Figure 4.3 illustrates the steps taken to generate data.

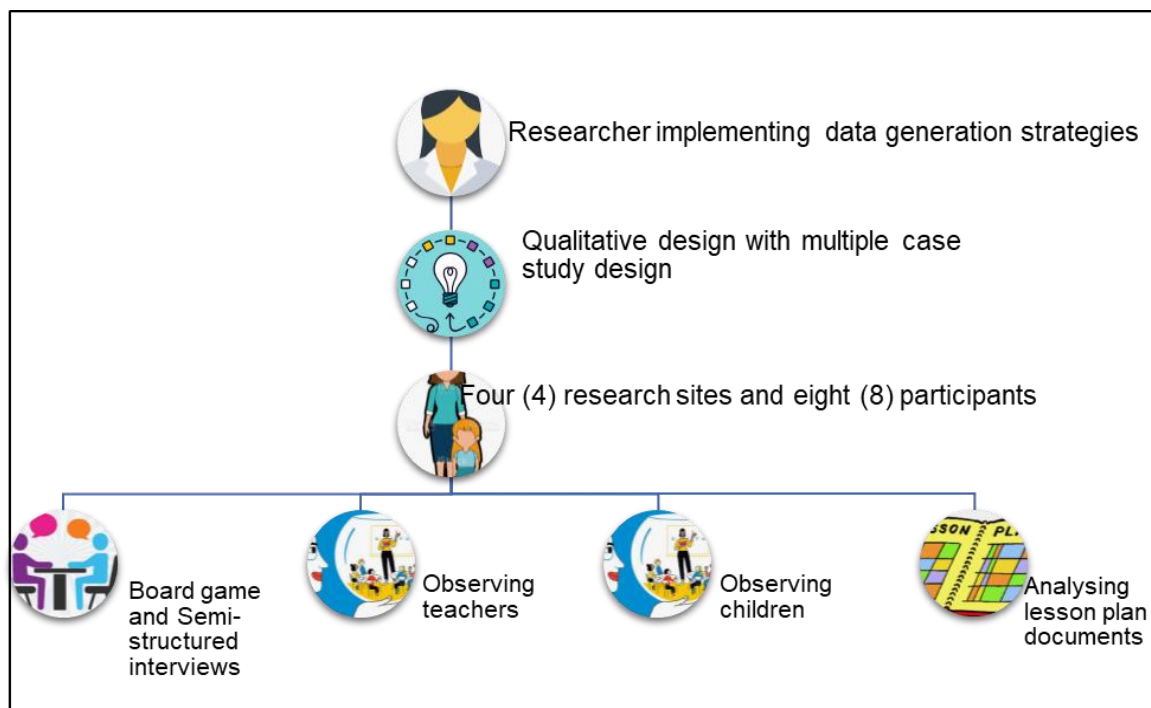


Figure 4.3: Data generation strategies and sequence

#### 4.4.1 Interview data

The participants took part in semi-structured interviews. The purpose of this was to gather an understanding of how preschool teachers plan and implement executive function skills through structured play. The questions explored the importance of executive function and structured play activities in learning, as well as teachers' roles during structured play games.

##### 4.4.1.1 Interview questions

The following questions were asked:

1. What do you think executive function means?
2. What do you think structured play means?
3. Do you think executive function and structured play are important for learning; if so why?
4. How do you plan for structured play and how often is it implemented?
5. How do you approach teaching executive function through structured play? (e.g. the techniques).
6. Which materials/resources do you use for structured play?

7. What do you as a teacher do when children are engaged in structured play activity?
8. What do you find challenging when teaching executive function through structured play?
9. What benefits do you experience when facilitating executive function through structured play?
10. Do you use children's preferences and interests when planning structured play or is it mostly themed/activity-based?

For the study, I developed a structured game for participants to play as they answered the interview questions. Since the study centres on executive function and structured play, I sought a form of integrating the two ideas (a structured game that could enhance executive function skills).



*Figure 4.4: Game board used for semi-structured interview*

Figure 4.1 illustrates what the game board looked like, as well as the form in which participants played the game. In this game, the questions were asked in the order of numbers (e.g. 1, 2, 3 etc), as well as the order of the participants (e.g T1, T2, T3 etc). Each tunnel represents a question number; the ball has to pass through the number tunnel before the question got asked. Participants also have to balance the tray without touching the ball; this is to help regulate how/where the ball passes through each tunnel. Participants in this game got to exercise their cognitive flexibility (different ways to make the ball pass through the tunnels), self-regulation (holding the board with both hands/regulating movement and pace of the ball), planning, memory and attention



(focusing on the number of the tunnel). Ultimately, the game aimed to show educators how executive function can be exercised in simply structured play activities.

The following subsections outline the interview questions that were asked by me and the responses obtained from the participants. All interviews were recorded, using a phone voice recorder.

#### **4.4.1.2 Responses to interview questions**

##### 1. What do you think executive function means?

Both the first two questions were asked to give participants the opportunity to elaborate on the knowledge preschool teachers' have of executive function and structured play. Question 1 and 2 are important since they extend the idea of what executive function and structured play are, as well as how they operate. The purpose of this question was to get information relating to the topic. Hence, respondents must understand the terms as it permits educators to provide the correct support.

*T1: Executive functions are divided into four [categories] and that would be the working memory, cognitive flexibility [and] self-regulation*

*T2: Your cognitive which covers basically everything, then you get your creative and physical part of it, and then you also get emotional sense*

*T3: It's the child's way of figuring things out on how to do something, so there's an end goal and how they get to that end goal*

*T4: ...[children] thinking for themselves*

*T5: The higher functioning of the brain... [it is] the ability to assess situations and how to react to it*

*T7: The ability for the kids to learn something through play...and uhm...sometimes to memorise certain things, sometimes to uhm make plans, other than just tell the kids you must do this and this and this...the kid must think a little bit further than just the normal [things]*

Although various perspectives were expressed, the common view among preschool teachers was that executive function are mental operations that regulate behaviour. Executive function enables children to respond, think ahead and think of the next step rather than simply rely on the teacher; hence, a cognitive operation first takes place (thinking for themselves) before physically responding (getting to the end goal). In figuring out how to do something, preschool learners were able to work more independently. From the responses obtained, the participants reveal extensive knowledge and understanding of executive function. The participants highlighted the importance of executive function as it allowed preschool learners to formalise a plan in order to reach their goal; this permitted preschool learners to think ahead, as well as overcome possible obstacles.

## 2. What do you think structured play means?

The purpose of asking this question was to explore teachers' knowledge of structured play: How structured play occurs and the methods used to facilitate this kind of play.

*T2: It's a teacher orientated activity. I have outcomes that I need to see, so I structure whatever the play has to be; you guys are trying new things in the sense that I can get those outcomes...so it's led by me*

*T3: Structured play is where I put out toys with a specific end goal. So I put out blocks and I want them to build towers out of it... I want you to do something about it... I don't just give it to them...there is an end goal and I have set up the end goal; how they get to it is up to them*

*T6: It sort of sounds like a formal activity that the child has to carry out...uhm so it's not free play, it's not their own imagination play, it's something that needs - it needs to be done in a certain way*

The participants explained the teacher's role during structured play, which includes leading the task; teachers organise the activity and the learners have to attain the end-goal. As structured play entails following a sequence of steps, preschool learners would need to know how to abide by rules when engaging during play and work towards achieving the goal. Overall, the participants' responses indicate that

structured play consists of a play-based activity that follows a unique structure that is arranged by the teacher. Structured play organises and guides how play should occur with the outcome being to attain a specific skill.

3. Do you think executive function and structured play is important for learning; if so, why?

This question was asked to understand why teachers' implement executive function and structured play in preschool learning. By discussing this question, the participants would ultimately highlight the role executive and structured play have in children's learning.

*T2: With structured play, it's important to teach them how to follow certain rules cause not everything you do can work... Then when it comes to executive function with structured play, so now it's the cognitive testing mentally. Are [children] able to withdraw and make their own decisions, or make decisions according to what you gave them?*

*T3: ...is very important because kids sort of need a guideline of how to do things... So you give them sort of guides but at the end, they have to, they figure everything out on their own*

*T5: It's [structured play] important for developing life skills...especially in 3-6 years group; you're building your foundation skill to last you for the rest of your life... It's your reasoning, your logic uhm, it's your memory recall, calling on your previous experiences so it's setting up your skills uhm that you will need to use for the rest of your life*

*T7: It's good for the brain function, it's good for...uhm learning how to deal with certain situations... Problem-solving is a big thing for us. When you big as well, you will always have to solve problems. You have to think out of the box.*

*T8: They have to be ready for shifting to something else*

According to the participants, executive function within structured play is important because it provides the necessary structure when working towards achieving a goal. From the ability to problem-solve or deal with different situations, executive function formulates a plan to tackle these experiences. Secondly, executive function and structured play assist with preschool learners' development. Given that preschool learners are young, they require the necessary skills to carry out mental operations and to work alongside others. As a result, preschool learners' cognitive, emotional, social and behavioural skills are improved, which helps children to achieve various goals and cope in their adult life.

#### 4. How do you plan for structured play, and how often is it implemented?

Question 4 was asked to understand the methods used in implementing structured play, as well as facilitating preschool learners' executive function.

Planning for structured play:

*T5: There's a certain way that the activity needs to be done, so we present that to the child first with the material and then once they know how to work with the material they actually able to take the material themselves - explore with it, experiment with it*

*T6: You [teacher] first show them [children] and then they can work through it themselves...the equipment is the structure basically in itself*

*T1: ...[children] need to remember that is how we go about everything because the minute you change the plan, then the teacher knows...we know that at this time this is how we do it, this is what we have to do*

*T4: ...know specifically this time slot for this activity. I try to keep the day routine; I try to keep it strict as I can*

How often implemented:

*T7: We have it every day*

*T2: It's an everyday thing*

*T3: Well before COVID-19 - we used to do structured play every single day ...for outdoor play... [however now] we also play games, we sit in a circle, we go find the shapes and then play like uhm, if we're doing colours...I spy with my little eye something red, and then they have to touch something red in the classroom. So it does get done every day and in different ways*

From these responses, it is clear that structured play was often introduced to the children. This enables preschool learners to explore and see what they are able to do on their own. Once the children had settled down, instructions were provided to detail how the activity would take place. Although the participants often implemented structured play, this met with certain challenges. For example, the COVID-19 pandemic affected the ability to apply specific structured play games; hence teachers had to alternate the play activity to overcome these barriers. The following images (from S2) illustrate how preschool learners had to practice social distancing during play; children had to maintain distance during lunch break, limiting interactions during play, as well as prohibiting certain toys from being used that previously formed part of structured play, these toys were mostly put away. The pictures in Figure 4.5 note the effect of COVID-19 pandemic on play.



*Figure 4.5: The effect of the COVID-19 pandemic on play*

5. How do you approach teaching executive function through structured play (e.g. the techniques)?

Question 5 was asked to specifically understand how executive function is taught through structured play. At this point, structured play is used as a sequence to develop executive function.

*T1: I would have to outline shape with them and then would first draw them or I would have pre-drawn shapes*

*T2: Whatever I do has to be implemented throughout the learning experience... I'll show them physically the letter A, show them what the letter A has in words for instance an apple, so the letter A – apple*

*T3: I provide instructions*

*T4: Because they are so little, I need to get their attention. So that's why – I think I told you earlier, I like to recap. I always say and I pretend like I don't remember whatever we were talking about yesterday or even an hour ago... [I ask] ...oh what did we talk about yesterday?*

*T5: The word from the Montessori movement is guidance and not teaching... So we showing the way uhm, we pointing the child in that direction and then the child is left there to work it themselves. So it's a deep learning and deep understanding uhm with the little ones*

*T6: Through the equipment, you basically show them to teach them how to do it and then they will...you almost don't speak to them...so that they can see what you do and then uhm they they'll follow that example very well... what's very important is that they must complete the cycle*

*T7: What we do is ask lots of questions [and] we hear what their answer is*

According to the participants, a variety of teaching techniques can be used to enhance executive function through structured play; however, the main objective should be to guide preschool learners during the learning experience. Although the participating schools had a similar way of implementing executive function through structured play, some of their learning styles differed due to the different curriculums/approaches that were followed. For example, S3 and S4 were more child-led as compared to S1 and S2 that were more teacher-led.

6. Which materials/resources do you use for structured play?

This question was asked to provide ideas of resources/items that can be used to strengthen structured play games.

*T2: I can use from anything depending on what we are doing on that day. So it can be printable... It can be worksheet that I give out directly, it can be painted as well*

*T1: With us we use bottled caps...so we'll have to draw the number or shape or letter, and then take the bottles caps and then glue them onto the line or we use string...or we use playdough*

*T3: We like using the wooden blocks, the Dupla - they love the Duplas*

*T5: Very visually and very concrete [resources]*

*T6: Depending on the age group...ya the small ones work with the red rods and the the the knot cylinders...that's all sensorial ... We start off with practical life for the little ones because there they learn to use the pens to grip and they learn [how to work with] pegs*

*T7: Lots of natural things. Uhm...leaves uhm...stones. Anything...all-natural materials or even uhm blocks uhm we've got 6-7 different kinds of blocks. From small to big, uhm LEGO® – big to small. So there's different things that you can - you can use*

The participants' responses indicate that a variety of materials/resources were used during structured play. The variety of materials/resources demonstrates that the teachers collected many different items; in doing so, the schools were rich in LTSM. The items collected were tactile and enabled preschool learners to explore their various senses (see Appendix L). These resources were obtained in various ways including being store-bought, recycled or gathered from nature.



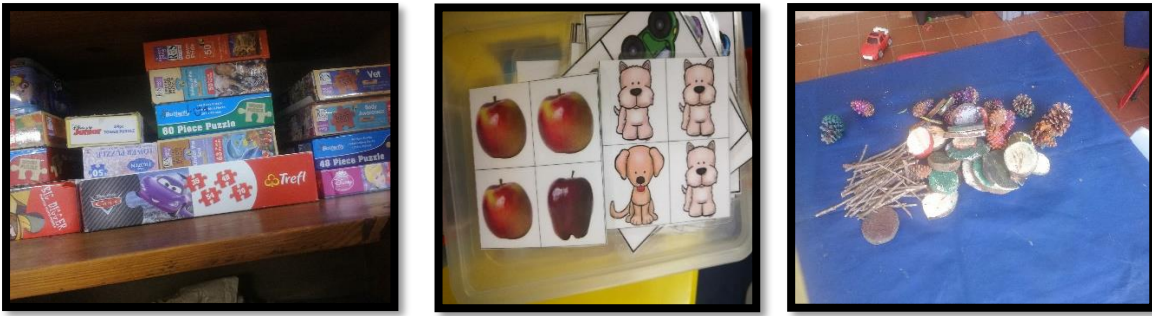


Figure 4.6: Materials/resources used for structured play

7. What do you as a teacher do (what role do you play) when children are engaged in structured play activity?

Question 7 was asked to understand teachers' perceptions of their roles during structured play.

*T2: Oversee. Supervise anyone who needs help, it is they are doing the right thing, even if someone is going to the left. You still give them encouragement ok at least you are trying*

*T1: A few kids who struggle a bit, so with them I would motivate them to first try and then if they struggle, then they say teacher can I have help, then I will show them and then I say ok there you can do it on your own. And then if they still need help I will show them again or try a different way of doing it*

*T3: Observe. And then if I see a child that's not really interested, I try to encourage the child to play... [if] I'll see that that one child is just sitting there, I'll maybe go and sit with them but I'll start playing with them and then eventually once they're actually playing then I'll just walk away. Just to guide them a little bit*

*T4: I need to make sure they [children] do it. So...uhm if they need help or they don't know what to do or...just encourage them*

*T6: You just direct... when they do like for instance a practical [activity]... there should be very minimal talk and then they should see the direction... You will [also] redirect them back to the task*



*T5: We don't say good job or...cause it's actually distracting to the child. We just thank the child after working with us. Once they have accomplished something, they show the great content about having achieved something*

*T7: We stand back to check what they can do. We don't tell them ok I think you must do it like this or you must do it like this. I already gave you the instructions and now I want to see what you can do with it. So uhm...I will never go tell them [and say] but you must do this or you must do that*

*T8: Asking questions*

Taken together, the teacher's role during structured play is quite extensive because teachers are required to multitask. Although the teacher act as guide during tasks, preschool learners are responsible for reaching the learning outcome themselves. Teachers facilitate the learning transition so that learners do not lose focus or give up before reaching the objective. Since structured play aims towards specific outcomes, the primary role of educators is to ensure the learning outcomes are achieved.

8. What do you find challenging when teaching executive function through structured play?

This question was asked to get teachers to talk about some of the challenges they face when implementing structured play to facilitate executive function; the purpose of this question is to gather information around factors that impede exercising executive function.

*T2: Remembering something that you just taught*

*T3: I'll read the story - the page and whatever ended there, they won't be able to remember what I just read*

*T2: There are certain things that they go through. So being selfish up to age 2 in general its fine but breaking out of that and going to now your age 3-4 4-5, it becomes a struggle*

*T3: You have children that just copy other children that don't attempt to do anything for themselves so that's quite difficult*

*T4: I used to get a lot of “I don’t know how to do it”. And in my class, I always say I don’t want to hear “I can’t or I don’t or want to” ... cause they’re too young to say that to me ... it’s a rule I say you never say “I can’t” because we can*

*T4: ... [boys tend to be] more busy and also aggressive... I think if if the child is used to getting what he wants at home, he automatically thinks that behaviour is how it’s gonna be forever, whereas in life we know that’s not how it is*

*T5: Because technology is not real it doesn’t always give children real-life experiences*

*T7: Sometimes, not all kids are in the mood to do certain things. Some kids maybe have uhm difficult day and maybe they had a difficult weekend*

The participants detailed internal and external factors that affect teaching executive function through structured play; these challenges are unique to learners’ age group. Teachers need to thoroughly prepare the learning experience so that they can consider alternative actions in the event of setbacks and overcome barriers that exist within play.

9. What benefits do you experience when facilitating executive function through structured play?

Question 9 highlights the advantages of facilitating executive function through structured play.

*T1: Responsibility. Because (1), you’re able to remember how to do your own work... And then another thing, if you are able to do work, you’re able to assist someone else in the class. So then you find that those who are able to do it and catch on faster. With the structured play, they are able to say - teacher but now I’m able to do it; can I assist this one?*

*T2: Once my children understand, their confidence shoots right up and then I’m quite happy cause now even if - let say they make a*

*mistake, we'll be able to say - teacher I made a mistake. They won't be shy about it; they'll be able to speak up*

*T3: Eventually they able to do things on their own. They don't need me to guide them all the time*

*T6: ...think the fact that they can concentrate, it builds up their concentration*

*T5: It just facilitates the order in the classroom and the social order as well cause uhm you know, if you've got children who are self-regulating and things, it makes the classroom pleasant for everybody*

*T7: The benefits that I see is that uhm, sometimes you've got this little guy that needs a challenge for his brain. [Children also] realise how do you work with your friends in class, how do you work with the cleaners, how do you work with the teachers... it's very important to have that uhm relationship and how to [interact with] the bigger kids*

According to the participants, implementing executive function through structured play provides various benefits; benefits that improve learning and social development in the learning environment. Secondly, teaching executive function through structured play serves as an effective teaching technique in preschools; this is because preschool learners are able to understand the learning concepts better, as well as engage with what they learn.

10. Do you use children's preferences and interests when planning structured play or is it mostly themed/activity-based?

The following question was added as it relates to the teaching techniques preschool teachers use to enhance executive function through structured play.

*T1: We do theme-based*

*T2: We'll accommodate everyone... everyone needs to feel that ok I can also do this or I can do that then they all show each other*

*T4: It's a combination of the two*

*T6: With Montessori, we should be observing what their interest are.  
So we follow the child, [we] follow their interest and [the] skills they  
trying to develop*

From these responses, it appears that though structured play is planned and led by the teacher; the teacher considers learners' interests in a task. By implementing what preschool learners love, children are more likely to participate and enjoy themselves during learning experiences. By accommodating preschool learners in lessons, their voices and skills are validated.

To conclude, Creswell (2016:92) characterises an interview as a mutual discussion where the interviewer asks the interviewee question to gather information; this process often occurs conversationally. For the study, the interviews provoked teachers' accounts of their perceptions and experiences when facilitating executive function through structured play. Various examples and information were detailed giving in-depth knowledge when explaining the participants' instruction techniques. The next section presents data obtained from classroom observations.

#### **4.4.2 Observations and field notes**

Apart from the semi-structured interviews, I also carried out classroom observations, using a guide to note experiences as well as events. Nieuwenhuis (2016:90) defines observation as a systematic process that documents behaviour without asking questions. Bertram and Christiansen (2016:84) further add the need to go to the location of the study to note what is taking place. For the study, I sought permission (through consent forms) from teachers as well as the parents, to observe preschool learners during a learning experience. The learners were indirect participants as the primary goal of the research was to see how their teachers facilitated executive function through structured play. After obtaining consent, I went to the classrooms/learning spaces to monitor how preschool learners behaved, how teachers applied instruction, and to note how preschool learners responded during learning experiences. In doing so, I developed separate observation guidelines to differentiate between teachers' and preschool learners' responses to gain a better understanding of:

- the teaching techniques utilised when facilitating executive function through structured play

- preschool teachers' roles when facilitating executive function through structured play
- resources used when facilitating executive function through structured play
- challenges and benefits preschool teachers experience when facilitating executive function through structured play

Field notes were made to document unique experiences and teaching techniques when facilitating executive function through structured play, these notes were all documented in a journal.

#### **4.4.2.1 Observation guidelines for observing teachers**

The study developed the following questions to note the behaviours of teachers during learning experiences. The questions were particularly designed to gather information relating to the focus of the study.

- 1) Which of the executive function skills are taught during the learning experience?
- 2) How does the teacher guide children to get organised for the activity?
- 3) Which approach does the teacher utilise to facilitate executive function during structured play?
- 4) What open and closed resources are used to develop executive function?
- 5) How does structured play activity support the acquisition of executive function skills?
- 6) What challenges does the teacher face whilst facilitating executive function?
- 7) What is the teacher's role(s) during structured play activity?

#### **4.4.2.2 Observation responses of teachers**

1. Which of the executive function skills are taught during the learning experience?

All teachers taught many of the executive function skills as listed above; this was often a result of implementing structured play. TO5, for example, said that because Montessori's teaching approach is based on self-regulation, giving children a choice as to which item they want to work with enables preschool learners to work independently and self-correct their mistakes. Secondly, skills such as attention,

working memory and cognitive flexibility were also enhanced when teachers guided preschool learners to get organised for a learning experience. It was therefore clear that the development or enhancement of executive function is an objective within the learning environment (TO1-TO4). Executive function skills are often applied effortlessly in everyday tasks such as following the routines, remembering instructions, as well as working flexibly (TO1, TO3, TO4).

## 2. How does the teacher guide children to get organised for the learning activity?

The answers obtained indicate unique ways that teachers help preschool learners get organised for an activity. For example, learning experiences often commenced with explanations of the task, after which the teacher would show preschool learners how to work with objects/life models (TO3-TO4). Lastly, daily transitions helped preschool learners to be guided into the next task/activity. Teachers modelled the steps of the activity before commencing the task; for this preschool learners had to be seated and listening (part of self-regulation) to learn from the teacher's instruction (TO2-TO4). At other times, educators sang songs and allowed seating to occur to assist children to get ready for an activity – self-regulation (TO3-TO4). Preschool learners responded well to the actions/resources teachers applied during learning experiences, this is because it captured preschool learners' attention and had them follow instructions for the learning experience. Being that preschools are often active beings, the teachers commenced learning experiences with music/dance routines to get children's attention and to get them to settle down after the dance experience took place (TO2; TO5). Interestingly, because S3 and S4 consisted of preschool learners working more independently and selecting the tasks they wanted to work with (child-led), teachers would help preschool learners get organised for learning by providing the necessary learning materials, and explaining how the object operates. This was mostly done if preschool learners struggled to use the learning materials correctly or did not know how to assemble the items correctly (TO5-TO8). The pictures in Figure 4.7 show teachers giving guidance to children in order for them to get organised for activities.





Figure 4.7: Teachers guiding preschool learners to get organised for activities

3. Which approach does the teacher utilise to facilitate executive function during structured play?

Teachers used a wide range of activities to facilitate executive function through structured play such as singing rhymes, following routines and working with peers (TO2, TO4). TO7 and TO8 however, used approaches that allowed preschool learners to discover, experiment, and practice self-regulation. This enabled preschool learners to work and explore more independently. TO5 used music to strengthen the physical activity in her learning experience. All learning approaches were child friendly and enabled preschool learners to be very active and so, help develop their physical capabilities. The pictures in Figure 4.8 show the approaches teachers used to facilitate executive function.



Figure 4.8: Approaches used to facilitate executive function

4. What are the open and closed resources that are used to develop executive function?

The schools are rich in resources, especially for play-based learning. Secondly, because the schools are situated in more affluent areas, teachers have the means to attain various learning materials (S1, S2, S3, S4). It is important to note that most of the resources the participants used were multi-purpose. According to TO5, teaching materials are always used with creative ability, thus enabling preschool learners to develop various skills (TO4, TO7, TO8). Secondly, all materials were child-friendly meaning that the items used during learning experiences/activities were age-appropriate and harmless to preschool learners. The pictures in Figure 4.9 show some of the open and close-ended resources.



*Figure 4.9: Examples of open and closed-ended resources*

5. How does structured play activity support the acquisition of executive function skills?

Structured play enabled preschool learners to practice and acquire executive function skills. TO6, for example, said that Montessori learning materials (games and tasks) supported the development of order, logic, concentration, self-regulation and memory. Being that preschool learners take part in structured play activities, it equates to following instructions, which, in turn, build executive function skills. In all the schools,



structured play activities were developed in such a way that it enabled preschool learners to be at the forefront of the task and have control, rather than to depend on the teacher to do everything for them (TO1-TO8).

6. What challenges does the teacher face whilst facilitating executive function?

*Table 4.2: The challenges teachers faced whilst facilitating executive function*

CODE		CHALLENGES INCLUDED...
S1	TO1, TO2	<ul style="list-style-type: none"> <li>✓ The struggle to complete learning activities as the children were very energetic</li> <li>✓ Children sometimes drifted off</li> <li>✓ Preschool learners completed their work slowly, therefore, requiring a push from the teacher</li> <li>✓ The struggle to follow instructions</li> <li>✓ Reprimanding learners often</li> <li>✓ The impact of COVID-19 on play – following social distancing correctly</li> <li>✓ Preschool learners struggled with sharing; complaining of others</li> <li>✓ Short attention span; preschool learners distracting peers</li> <li>✓ Task initiation problems; problems to complete a task</li> </ul>
S2	TO3, TO4	Some of the preschool learners in S2 struggled to follow instructions correctly; hence teachers had to show how the work needed to be done correctly. Teachers noticed that preschool learners were less imaginative during structured play activities; hence they felt it was the result of the children frequently engaging with technological devices, and also not being used to playing physical games. The COVID-19 pandemic limited preschool learners even more from engaging with toys/games since the children had to frequently practice social distancing, as well as sanitise play areas.
S3	TO5, TO6	<ul style="list-style-type: none"> <li>✓ Repeating instructions for the child</li> <li>✓ The ability of the child to concentrate</li> <li>✓ The ability of the child to self-regulate behaviour and emotions</li> <li>✓ In the case of boredom, children became uncooperative</li> </ul>
S4	TO7, TO8	<ul style="list-style-type: none"> <li>✓ Boys are more active hence they engaged in a lot of physical activities</li> <li>✓ The ability to regulate emotions and share toys</li> <li>✓ Some preschool learners interfered in the activity of others</li> <li>✓ Others had trouble focusing on what the teacher had to say; preschool learners had moments where they were inattentive and thus busy with their things.</li> </ul>

## 7. What is the teacher's role(s) during structured play activity?

Teachers' roles included providing more challenging tasks, as well as maintaining preschool learners' motivation in the work (TO1). TO6, for example, modelled the correct behaviour, presented the activity, observed preschool learners' work and guided those who struggled. TO3 and TO4 showed their learners how to complete the task and then asked them to repeat the same actions. TO7 and TO8 set up the play stations, asked the learners about the actions which they needed to take, praised preschool learners whenever they completed a task and assessed the level of progress made. All teachers commenced their learning experiences by gathering preschool learners in one place before commencing the task (TO1-TO8). Lastly, the teachers' roles enabled them to manage the learning experience and to ensure that children attained the necessary skills. Preschool learners were supported during tasks but were also given enough room to attain the learning outcome themselves. The pictures in Figure 4.10 show teachers' roles during structured play.



*Figure 4.10: Teachers' role(s) during structured play*

### 4.4.2.3 Observation guidelines for preschool learners

The study used the following guidelines to note preschool learners' behaviour and responses during learning experiences.

1. Do children easily follow the teacher's instruction during the activity?

2. What executive function skill do children struggle with the most?
3. What benefits do preschoolers experience when exercising executive function through structured play?
4. How do the children manage and organise the activity presented by the teacher?
5. Is there any evidence of indecisive behaviour by the child during the activity?
6. How does structured play facilitate executive function in children?
7. What are the emotional and physical responses of the child during structured play?
8. What executive function skills are evident when children engage in structured play?
9. What approaches were used to help children acquire executive function skills?
10. Any evident examples of structured play activities?

#### **4.4.2.4 Observed responses of preschool learners**

1. Do children easily follow the teacher's instruction during the activity?

Preschool learners had to be told the instructions multiple times before following them correctly (LO3, LO4). Secondly, the learners were interested once they saw what they were going to do (visual appeal). Thus, the point highlights the need for teachers to capture preschool learners' attention as this develops their interests in a learning experience (LO2, LO3). Preschool learners were also able to follow instructions, due to the transitions that guided them on what they needed to do. Lastly, with movement gestures, these actions needed to be taken to complete a task (LO1-LO8).

2. What executive function skill do children struggle with the most?

The question strives to identify those executive function skills not yet prominent in preschool learners in order to highlight those skills that preschool learners struggle with the most. Some of the challenges that were noted included sitting still (LO1), settling down, taking turns (LO3) and shouting out the answers (LO2) – these all relate to inhibitory control, also known as self-regulation. Furthermore, since preschool learners struggled to plan and organise themselves during activities, teachers had to guide and instruct the children during tasks. Based on the observation as well as literature review, it seems that weak executive function might be a result of preschool learners' age (Monette et al., 2015; Traverso et al., 2019). Being that executive

function rapidly develop from the age of 3-5; the children are still developing and learning to regulate executive function skills; thus, teachers often had to assist the children in those areas which they struggled with (see section 2.1.6).

3. What benefits do preschool learners experience when exercising executive function through structured play?

The benefits that preschool learners experienced when exercising executive function through structured play included working well with others (LO1), focusing better on play activities (LO2), working with various resources, exposing preschool learners to different kinds of learning materials, and ultimately exercising various skills (LO3, LO7, LO8). In relation to executive function skills, preschool learners attained better attention, inhibitory control, as well as cognitive flexibility.

4. How do the children manage and organise the learning activity presented by the teacher?

Teachers managed and organized learning activities by providing seating structure, following routines, as well as reinforcing self-regulation actions (LO1, LO5, LO6). Activities in LO1, LO2 and LO4 were teacher-led. The teachers provided information as well as instructions on the task and preschool learners had to fulfil them. Preschool learners would have to listen to the teacher and be seated in their correct places; thus, children did not require managing or organising the learning activity. For LO3, LO5, LO6, LO7 and LO8, the learning activities are child-led; hence, the children had to organise/manage themselves during a task. Secondly, the children got to choose what they wanted to do/work with and make sure they had the necessary materials.

5. Is there any evidence of indecisive behaviour by the child during the learning activity?

Indications of indecisiveness included preschool learners looking around at their peers' work before tackling their work (LO2, LO3). The children were often indecisive as a result of being uncertain of the task, lacking focus and feeling disinterested. Literature notes indecisive behaviour as a result of executive dysfunction (having weak executive function); this hinders children from working effectively during tasks (Halperin et al., 2012; Marlowe, 2000; O'Neill et al., 2012). Emotional indecision, however, was minimal (LO1-LO8). This illustrates the level of confidence preschool

learners had when engaging in the learning activity because the activity they were going to do was exciting (LO2, LO7, LO8).

#### 6. How does structured play facilitate executive function in children?

The unique ways that structured play facilitated executive function included incorporating music, movement exercises and following routines. The pictures in Figure 4.11 show how executive function was facilitated through structured play.



*Figure 4.11: Structured play facilitating executive function*

In LO1 for example, the children sang songs/rhymes with commands. LO2 built items with LEGO® blocks. LO3 played the game ‘I Spy with My Little Eye’ (identifying the correct object in the classroom); and with LO4, LO7 and LO8, the children completed an obstacle course which ultimately enhanced self-regulatory and gross motor skills. When preschool learners followed rules, this regulated their behaviour as well as instilled executive function skills, for example, developing self-regulation.

#### 7. What are the emotional and physical responses of the child during structured play?

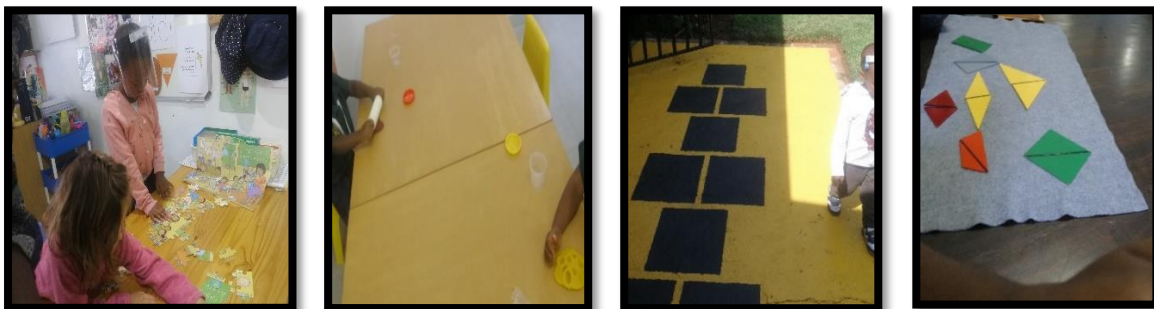
All of the children approached structured play games with keenness (LO1-LO8). As preschool learners participated in activities, I could see their level of excitement and the fun children had while doing the task (S1, S2, S3, S4). This made preschool learners more willing to participate and work with their peers; children loved playing games without realising it was an actual learning experience. Also, a lot of the children seemed to express enjoyment because they could see the teacher was having fun – the teacher’s energy was reciprocated by the children (LO2, LO8). In LO7 however, one of the learners had an emotional outburst during a structured game task. The child was angry for not getting his way during the task. Hence, the teacher calmed this child down by providing alternative actions (when dealing with strong emotions). The



emotional outburst, in this case, reminds us that preschool learners may battle to regulate their frustrations (Monette et al., 2015; Slot et al., 2017; Zelazo et al., 2017:3) and that teachers should assist preschool learners to understand appropriate and inappropriate reactions towards getting what they want.

#### 8. What executive function skills are evident when children engage in structured play?

Although it was not easy for the teachers to capture preschool learners' attention at the beginning of a learning experience, once learners were gathered and settled, they paid attention to what the teacher had to share (LO1, LO8). During play, preschool learners' working memories were active as they had to remember the instructions provided by the teacher (LO3, LO4). Furthermore, preschool learners were required to self-regulate their actions/movements during the obstacle courses (LO4, LO8). When playing with items such as puzzles and shapes, preschool learners paid attention to the way the pieces were handled/placed, they worked flexibly in forming shapes through playdough, as well as remembered the instructions to play hopscotch as a game (LO1, LO3, LO2, LO5).



*Figure 4.12: Evidence of executive function during structured play*

The executive function skills that were not so evident during tasks included time management and organising; this was due to teachers planning the task and handing out resources preschool learners would use. Thus, the teacher organised and planned how the activities would occur (LO1-LO8).

#### 9. What approaches were used to help children acquire executive function skills?

A lot of repetition occurred to assist/remind preschool learners (LO1). Storytelling also allowed preschool learners to practice paying attention as well as capturing details from the story (LO2, LO3, LO4, LO8). The approaches used in LO7 and LO8 were often child-led which preschool learners to explore and discover techniques on their

own. LO1 and LO3 were told by their teachers what would happen next, this enables preschool learners to proceed onto the next tasks. In LO5, LO6, LO7 and LO8, the approaches used include questioning, problem-solving as well as discovering. This is because the learning environment is more child-centred compared to other schools.

10. Any evident examples of structured play activities?

Structured play activities included working with puzzles (LO1), sorting shapes/colours (LO3), finger painting (LO8), and playing 'I Spy with my Little Eye' (LO3). Other structured play activities included speed/racing, assorting and memory games. The most common structured play activity was the obstacle courses (LO3, LO4, LO6, LO7, LO8); hence, children had to follow the teacher's instruction and complete steps correctly. All the learning experiences had children working with tactile materials, this enabled children to work with their senses and learn how to use new items (LO1-LO8).



*Figure 4.13: Evidence of structured play activities*

In summary, the observations made shows that the participants displayed how teachers and preschool learners responded to executive function through structured play. The participants demonstrated various ways to implement executive function skills, such as modelling the task, seating children before starting a learning experience, explaining what the learning experience would be all about, and informing children how to regulate themselves. Moreover, the learning environment, as well as resources, worked hand-in-hand to facilitate executive function skills through structured play.

Some of the challenges of implementing executive function consist of inattentiveness, emotional regulation and the lack of working memory; however, the benefits were that preschool learners attained cognitive flexibility, social skills and independence. In ending this section, I would like to note that teachers played a significant role in guiding


and supporting preschool learners during tasks. Being that teachers know the learning outcomes better than children; the teacher needs to follow how the child plays to ensure the right outcome/skill is attained. In the next section of the study, I detail data obtained from teachers' learning experience lesson plans.

#### 4.4.3 Analysis of lesson plans

I developed a lesson plan that would document teachers' experiences when facilitating executive function through structured play. The purpose of this structure was to detail the steps and teaching techniques used to plan a learning experience involving executive function and structured play. Secondly, I did not capacitate teachers on how to use structured play to develop executive function; teachers simply filled in necessary details relating to the purpose of the study. It is worth noting that Chapter 2 already studied the curriculums and learning approaches in-depth (see section 2.6); therefore, I only analysed the participant's lesson plans to understand the preparation of learning experiences.

The following template (as seen in Table 4.3) was developed by the University of Pretoria (n.d) to develop lessons during teaching practices. Being that the objective of education in the 21<sup>st</sup> century is to design opportunities for learning to take place across learning environments, teachers work purposefully to ensure that learning experience 1) meets the learning outcomes, 2) is suitable in most ways, and the mode of delivery succeeds in achieving the learning outcomes. Hence, I used this lesson plan to understand how teachers plan a learning experience around executive function and structured play. In the document, section A was completed by myself, whereas section B was completed by the participants. Section C covers the overall finding gathered from all learning experiences; this was completed by the preschool teachers.

*Table 4.3: Lesson plan of the learning experiences*

 <p>UNIVERSITEIT VAN PRETORIA UNIVERSITY OF PRETORIA YUNIBESITHI YA PRETORIA</p>	<p><b>Section A:</b> Categories of learning experiences</p>
<p>Completed by researcher</p>	



<b>1.1 TYPE OF LEARNING EXPERIENCE:</b>	Learning experiences
<b>1.2 LENGTH OF PERIOD:</b>	40mins
<b>1.3 GRADE:</b>	RR
<b>2. KNOWLEDGE AREA</b>	
<input checked="" type="checkbox"/> Verbal/Linguistic	<input checked="" type="checkbox"/> Logical/Mathematical
<input checked="" type="checkbox"/> Kinaesthetic/Bodily	<input checked="" type="checkbox"/> Naturalistic
<input checked="" type="checkbox"/> Visual	<input checked="" type="checkbox"/> Interpersonal
<input checked="" type="checkbox"/> Auditory	<input checked="" type="checkbox"/> Self-care
<input checked="" type="checkbox"/> Creativity/Art	<input checked="" type="checkbox"/> Knowledge about the world
<b>3. INTEGRATION WITH OTHER SUBJECTS:</b>	
<input checked="" type="checkbox"/> Language	<input checked="" type="checkbox"/> Mathematics
<input checked="" type="checkbox"/> History	<input checked="" type="checkbox"/> Arts
<input checked="" type="checkbox"/> Life skills	<input checked="" type="checkbox"/> Sports/movement
<input type="checkbox"/> Geography	<input type="checkbox"/> Science
<b>4. MULTIPLE INTELLIGENCES:</b>	
<input checked="" type="checkbox"/> Verbal/Linguistic	<input checked="" type="checkbox"/> Logical/Mathematical
<input checked="" type="checkbox"/> Kinaesthetic/Bodily	<input checked="" type="checkbox"/> Naturalistic
<input checked="" type="checkbox"/> Visual	<input checked="" type="checkbox"/> Interpersonal
<input checked="" type="checkbox"/> Auditory	<input checked="" type="checkbox"/> Intrapersonal
<b>5. EVIDENCE OF LEARNING (ASSESSMENT)</b>	
<input checked="" type="checkbox"/> Observation	
<input checked="" type="checkbox"/> Probes	
<input checked="" type="checkbox"/> Assess learning outcomes	
<input checked="" type="checkbox"/> Compare to determine progress	
<b>6. LTSMs (Educational media)</b>	
<input checked="" type="checkbox"/> Natural objects	<input checked="" type="checkbox"/> Posters
<input checked="" type="checkbox"/> Recycled objects	<input checked="" type="checkbox"/> Stationery
<input checked="" type="checkbox"/> Toys	<input checked="" type="checkbox"/> Musical instruments
<input checked="" type="checkbox"/> Sports equipment	<input type="checkbox"/> Technological items



## Section B:

### Outline of learning experiences

Completed by teachers

#### **Introduction:**

For the introduction of the learning experience, teachers were required to note how learning experiences generally commence. The introduction describes the protocols/methods used to capture preschool learners' attention when starting a learning experience. With DA1 and DA2, the participants wrote that their learning experience would start with a brief discussion where the teacher shows, explains and talks about the topic at hand; the class also discusses the unique traits of the subject at hand. Following a brief discussion, teachers then provide instruction on how the activity will follow (DA3). It is worth noting that a learning experience can also commence with teachers recapping information from the previous learning experience; this is done to refresh preschool learners' memories in preparation for new knowledge.

#### **Development:**

For the development of a learning experience, the participants outlined how the learning experience would unfold, what topic would preschool learners be learning and detailing how the topic would be learnt. According to DA2 "students would learn how to describe and draw something; learn the parts of the plant and participate in art activities". Similarly, DA3 wrote that "we will be learning to name and identify basic 2D shapes and colours". DA4 interpretation was unique in that it focused more on detailing the necessary skill that would be learnt for example, "cross the midline; catch a ball; jump hopscotch and execute simple star jumps". Taken together, the participants provided their vision and outlined the objectives that would be met. Furthermore, the development of the learning experience outlined the games played, for example, DA3 wrote that her class would play "I Spy with my Little Eye".

#### **Conclusion:**

The conclusion of the learning experience entails describing how the learning experience would hopefully end. The conclusion outlines steps that would be followed to ensure preschool learners have attained the necessary skills. DA1 wrote, "at the end of the learning experience each child should at least be able to recognise more than one shape, count the sides and be able to find the shapes all around them". DA4 however, wrote "give them [preschool learners] a second opportunity to try again"; this would enable the teacher to see if the learner acquired the necessary skill.



**Section C:**

Planning the learning experiences

Completed by teachers

<b><u>Class activity</u></b>	<b><u>Curriculum content/ Learning principles</u></b>
<p>Teachers described the class activities that would take place during the learning experience – in this case, actions words encapsulated class activities. For DA3, her class activity included sorting and matching, as well as dealing with colours and shapes. Similarly, DA1 stated that children will be “using playdough and sticks to recreate the shapes”. For DA2 the learners will make their sunflower, sing spring theme song – all things bright – and clap to the spring vocabulary. Classroom activities are unique in the way the teachers plan them to occur. The participants showed versatility, as well as creativity when discussing their class activities.</p>	<p>Curriculum content was the only area that did not align with developing/improving executive function. Reasons included the fact that teachers were not familiar with linking curriculum/approach guidelines with executive function skills. In other cases, two of the preschools followed outcomes that do not match the NCF – for example, S3 and S4. In DA2, the document stated that children need to name and identify basic 2D shapes and colours. Similarly, wrote of “introducing maths skills and increase vocabulary as well as literacy”. Both points have been indicated in the NCF, NELDs as well as ISASA documents; hence, the participants know where the knowledge they teach children stems from.</p>
<p><b><u>Outcomes</u></b></p> <p>Outcomes of the learning experience entail the objectives that need to be met after a task. DA1 wrote that preschool learners should be “able to define spring; name the plant and its parts and develop hand and eye coordination”. In relations to shapes, DA2 wrote that the outcome of the learning experience would be to memorise the names of the shapes. With DA7, it was noted that preschool learners should be able to independently recognise numbers and apply their information in everyday use; thus, the outcome not only focused on the short-term goal but also long-term result. Outcomes are important for planning in that they clarify the objectives teachers would need to assess. Hence, outcomes provide sense of purpose for doing the activities teacher do.</p>	<p><b><u>Assessment</u></b></p> <p>The assessment included measuring to see what preschool learners learnt or testing to see if preschool learners attained the necessary skills. DA4 wrote that the teacher would “check that each preschool learner can do a specific task”. DA1 and DA3 however, developed questions that would help the teacher answer if preschool learners attained the right skills for example: “are the learners able to find and match the shapes correctly?” – DA3. Answering a yes or no determines if preschool learners attained the necessary skills. For DA7and DA8, their approach included the ability to recognise as well as count from 1-5 with ease. The teachers then documented preschool learners’ level of competence in the task.</p>

<b><u>Executive function skills</u></b>	<b><u>Structured play activity</u></b>
<p>Teachers identified some of the executive function they desire to work on; this is to ensure that executive function skills are implemented in learning experiences. DA3 listed working memory, organisation, emotional control and inhibiting behaviour. DA2 mentioned self-regulation, whereas DA4 described the process of metacognitive thinking (analysing thoughts and actions). Identifying some of the executive function skills during a learning experience, permits teachers to monitor which skills have been practised, those that need more practising and note which executive function skill they have not tried.</p>	<p>Teachers outlined structured play activities they will implement; this is to ensure that structured play activities are implemented in learning experiences. DA4 listed hopscotching as well as midline crossing. DA2 stated that preschool learners would be using playdough/sticks to recreate the shapes –thus design the same picture. DA1 wrote of allowing preschool learners to play puzzles, whereas DA3 noted matching and sorting shapes/colours, as well as playing the Eye Spy game. For DA7 and DA8, since the activity consisted of setting the table, preschool learners had to sort the table items.</p>

Taken together, lesson plans act as a blueprint for educators to follow when facilitating executive function skills through structured play. The purpose of analysing this document was to understand the stages, teaching techniques and objectives teachers hoped to achieve. S1, S2 and S4 for example, contributed knowledge according to the school's learning principles. It is worth noting that the lesson plan template will not always fit the approach of a school – as seen with S3 because the Montessori approach consists of learning tasks where the children select the activities they want to do. Learning occurs through working with what the child has selected. Hence, for a Montessori educator, the lesson plan document would therefore act as a guide to ensure that none of the relevant sections (executive function and structured play) is ignored. Through applying a lesson plan, I hoped to assist educators to think ahead of the outcomes and assessments that educators ought to look out for when facilitating executive function through structured play. Should the lesson plan not fit the criteria of the school's approach, teachers could always adapt the document to fit the school's learning style. The next section details the themes that emerged from the study's findings.

#### **4.5 DATA INTERPRETATION OF THEMES AND SUB-THEMES**

As the study explored how preschool teachers facilitated executive function through structured play, the data sets centre around this research question. According to Bogdan (2003:147) “data interpretation refers to developing ideas about your findings and relating them to the literature.” Moreover, Madjitey (2014) asserts that the main purpose of clarifying information is to create meaning and relevance of the data. After examining the interview, observation and learning experience plan responses, I developed clusters of meanings based on words, phrases, and examples the participants gave (see Appendix M). These clusters were then grouped to establish categories (also known as sub-themes). Table 4.6 illustrates how I derived my theme and sub-themes based on the data generating techniques I used.

Table 4.4: The process of identifying themes

SUB-THEMES:		THEME:
<ul style="list-style-type: none"> <li>Teaching techniques</li> <li>teachers' roles</li> <li>resources</li> <li>challenges and benefits</li> </ul>		Enhancing executive function through structured play
INTERVIEW	OBSERVATION	DOCUMENT ANALYSIS
<ol style="list-style-type: none"> <li>1. What do you think executive function means?</li> <li>2. What do you think structured play means?</li> <li>3. Do you think executive function and structured play is important for learning; if so why?</li> <li>4. How do you plan for structured play and how often is it implemented?</li> <li>5. How do you approach teaching executive functioning through structured play (eg the techniques)?</li> <li>6. Which materials/resources do you use for structured play?</li> <li>7. What do you as a teacher do when children are engaged in structured play activity (role)?</li> </ol>	<p><b>TEACHER</b></p> <ol style="list-style-type: none"> <li>1. Which of the executive function skills are taught during the learning experience?</li> <li>2. How does the teacher guide children to get organised for the activity?</li> <li>3. Which approach does the teacher utilise to facilitate executive function during structured play?</li> <li>4. What open and closed resources are used to develop executive function?</li> <li>5. How does structured play activity support the acquisition of executive function skills?</li> <li>6. What challenges does the teacher face whilst facilitating executive function?</li> <li>7. What is the teacher's role(s) during structured play activity?</li> </ol> <p><b>CHILDREN</b></p> <ol style="list-style-type: none"> <li>1. Do children easily follow the teacher's instruction during the activity?</li> <li>2. What executive function skill do children struggle with the most?</li> </ol>	<p><b>LESSON PLAN</b></p> <ol style="list-style-type: none"> <li>1. Class activity</li> <li>2. Curriculum content</li> <li>3. Outcomes</li> <li>4. Assessment</li> <li>5. EF skills</li> <li>6. SP activity</li> <li>7. Resources</li> </ol>

<p>8. What do you find <b>challenging</b> when teaching executive function through structured play?</p> <p>9. What <b>benefits</b> do you experience when facilitating executive function through structured play?</p> <p>10. Do you use children's <b>preferences and interests</b> when planning structured play or is it mostly themed/activity-based?</p>	<p>3. <b>What benefits do preschoolers</b> experience when exercising executive function through structured play?</p> <p>4. How do the children <b>manage and organise</b> the activity presented by the teacher?</p> <p>5. <b>Is there any evidence of indecisive</b> behaviour by the child during the activity?</p> <p>6. How does structured play <b>facilitate</b> executive function in children?</p> <p>7. <b>What are the emotional and physical responses</b> of the child during structured play?</p> <p>8. <b>What executive function skills</b> are evident when children engage in structured play?</p> <p>9. <b>What approaches were used</b> to help children acquire executive function skills?</p> <p>10. Any evident <b>examples of structured</b> play activities?</p>	
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In the next section, I discuss the main theme of the study - enhancing executive function through structured play. Sub-themes include aspects such as the teaching techniques applied by preschool teachers, teachers' roles during learning experiences, the resources that were used, as well as the challenges and benefits teachers and preschool learners experience. The sub-themes are linked with the theoretical frameworks of the study – the sociocultural theory (Bodrova et al., 2013; Bodrova & Leong, 2013), as well as the metacognitive theory (Bryce et al., 2015; Roebbers, 2017).

*Table 4.5: Summary of themes*

THEORETICAL FOUNDATION	CONCEPTUAL DESCRIPTORS	COMPONENTS	SUB-THEMES	MAIN THEME
Sociocultural theory	Scaffolding	guiding, modelling, instructing, recap-repeating	Teaching techniques	Enhancing executive function through structured play
	Structured play	Child-led activities, child's interest		
Metacognitive theory	Metacognitive knowledge, strategies and goals.	Identify the most suitable teaching technique		
Sociocultural theory	Scaffolding More Knowledgeable Other Zone of Proximal Development Sociocultural interaction	supervise, alternate, assess, motivate, assist, probe	Teacher's roles	
	Metacognitive theory	Metacognitive knowledge, strategies and goals		
Sociocultural theory	Sociocultural interaction Structured play	Open-ended materials/toys Close-ended materials/toys Natural objects	Resources	
	Metacognitive theory	Metacognitive knowledge, strategies and goals		
Sociocultural theory	Sociocultural interaction Scaffolding More Knowledgeable Other	cooperation, communication, classroom management, technology,	Challenges and benefits	



THEORETICAL FOUNDATION	CONCEPTUAL DESCRIPTORS	COMPONENTS	SUB-THEMES	MAIN THEME
	Zone of Proximal Development	autonomy, confidence		
	Structured play	initiating, peer assistance		
Metacognitive theory	Metacognitive experiences and strategies	remembering, emotional regulation, persisting, concentration		

#### 4.5.1 Main theme: Enhancing executive function through structured play

The main theme strived to answer how preschool teachers enhance executive function through structured play. Based on the empirical findings, executive function is enhanced through structured play through various techniques that teachers apply during learning experiences that support children to attain the necessary skills. Furthermore, the roles that preschool teachers play, as well as the resources utilised in structured play games assist preschool learners to attain executive function. This is because the guidance teachers provide steer preschool learners in the right direction to complete tasks successfully. Lastly, in understanding how executive function is enhanced through structured play, the study enlightens readers of the challenges and benefits that come with exercising executive function through structured play.

##### 4.5.1.1 Sub-theme 1: Techniques used

The first sub-theme explores the teaching techniques used to facilitate executive function through structured play. The techniques shed light on how learning experiences are structured to support executive function through structured play. The findings ultimately reveal the teaching techniques and disposition when facilitating executive function skills through structured play.

##### *Guiding*

The first technique the participants implemented was that of *guiding* preschool learners; this is because structured play requires preschool learners to be led and supported during a learning experience. For the participants, guiding involves a continuous practice whereby the instructor refrains from giving preschool learners the answers or telling them what to do; this depended on the child's level of understanding

or capability of doing a task. According to the participants, it is important that teachers guide preschool learners correctly as it will enable them to use the learning material on their own (see section 4.4.1.2). This corroborates Loizou's (2017:786) explanation of how guidance consists of directing children until they can work independently (see section 2.8.1.1; 2.8.1.2). Since Marlowe (2015:448) has found that the Montessori curriculum is based on the learning course of discovery and learning from mistakes; teachers can assess, as well as determine, if preschool learners have attained the necessary skills. This was seen when TO5 and TO6 followed their learners' actions during a task. Taken together, the empirical data corroborate means of guiding preschool learners during play according to literature (Axelsson, Andersson & Gulz, 2016; Russell, 2015). Guiding means having an observant presence and monitoring the child to ensure they do not go off-track. In relations to executive function, being guided permits preschool learners to practice self-regulation where children perform the necessary actions to achieve their desired goal.

### *Modelling*

The second technique applied by the participants consisted of *modelling* the learning experience activity. Literature acknowledges that modelling is one of the best forms of teaching preschool learners a skill (Jensen et al., 2019:8; Russell, 2015). Florez (2011:46), for example, affirms that "the most powerful way teachers can help young children learn self-regulation is by modelling and scaffolding during ordinary activities". Similarly, this view is supported by Loizou (2017:785) who writes that "adults need to scaffold play by modelling the symbolic use of objects". According to the participants, this entailed showing how a task is done (see section 4.4.1.2). Before showing the steps, educators had to get the children's attention in order for them to follow the demonstration. Once the teacher got the children's attention, the learners observed what the teacher did, and then followed the steps (as per instruction) to complete the task. The final step of modelling consisted of preschool learners rehearsing the steps before commencing with the task; an example of this was noted during the observation of obstacle courses (see section 4.4.2.4). According to the empirical data, teachers modelled the necessary actions during activities with obstacle courses so that preschool learners could visually comprehend the objective of a task - especially if preschool learners struggled to understand words that relate to an action or remember the necessary steps (see section 4.4.2.2). Secondly, the models and concrete

teaching materials were always used with creative ability. Modelling helped to scaffold preschool learners to complete a task correctly (see section 2.8.1.2). From teachers' demonstration of what needs to be done, preschool learners could follow the same steps, which ultimately led them to complete the task successfully. Taken together, the participants' responses support the ideas put forward in literature of modelling activities during structured play (Dias & Seabra, 2017; Fler et al., 2017; Russell, 2015).

### *Instructing*

The third technique applied to facilitate executive function skills during structured play consisted of providing *instructions*. According to Barker and Munakata (2015:96) when adults plan learning experiences, they often expect preschool learners to follow the instructions provided so preschool learners can remain focused on the task. Moreover, Marlowe (2000:449) upholds that “direct and specific labelling involves explicitly highlighting steps in procedure components of a situation and or expectations for behaviour; hence, preschool learners who do not learn the process of the task need be taught through direct instruction, as well as practising the activity”. Without instructions, preschool learners would miss the steps needed to reach the learning outcome. Based on the responses obtained, instructions enabled preschool learners to follow a routine/sequence of a task; this leads to the development of the working memory since preschool learners are grasping vital information given by their teacher (see section 4.4.1.2). Furthermore, instructions assist preschool learners to regulate actions/behaviour in class; this is necessary to achieve the learning objective. The empirical data informs us that teachers provided instructions before commencing a task. During the course of the teacher giving instructions, preschool learners usually had to sit still or keep quiet to hear the necessary steps (see section 4.4.2.2). Other instruction techniques included looking at the teacher when they spoke, using a calm/positive voice, making gestures to highlight what the educator wanted the learners to do, removing possible distractions, and outlining the steps in short/simple ways. This permitted preschool learners to understand what they were working towards, as well as follow the necessary steps. Literature (Duval et al., 2016:4; Marlowe, 2000:449) supports the same techniques applied by the participants during structured play (see section 2.7.2.1).

### *Recap/repeating*

*Recapping/repeating* knowledge proved to be the fourth technique; repeating knowledge to young preschool learners is vital for their learning (Diamond, 2012:337). Similarly, Barker and Munakata (2015:92) note that “young children often need reminders about how and when they should adjust their daily routines to accomplish the things they would like to do, even for seemingly simple tasks such as remembering to bring cookies to school”. Although older children are more capable of planning activities in self-directed ways without adult interference, preschool learners often forget vital information during the learning experience (see section 2.4.1; 2.4.2). Hence, the participating teachers often commenced the learning activity by recapping knowledge or work that had previously been done (see section 4.4.2.2). In addition, recapping consisted of teachers reminding/repeating knowledge so that it enabled preschool learners to accommodate new knowledge and ultimately develop an understanding of their own. Thus, when teachers repeated any information/steps required for a task, it allowed preschool learners to stay on track and complete their work successfully (see section 4.4.2.4). Recapping/repeating proved to be vital during learning experiences as it enabled preschool learners to follow instructions, perform the necessary task and develop new meaning of the topics taught in class which ultimately stimulates preschool learners’ cognitive and learning abilities. For Garcia-Madruga, Gomez-Velga and Vila (2016:3-4), the ability to remember information rests on preschool learners’ abilities to be attentive and use their working memory (see section 2.4.2); this was evident in the study as the participants mentioned the importance of preschool learners remembering vital information to get work done (see section 4.4.1.2). Hence, preschool learners’ attention and working memory had to work in collaboration to retrieve then further utilise the provided information.

### *Child-led activities*

According to literature (Weisberg et al., 2016:178; Whitebread et al., 2017:24), *child-led activities* is one of the most vital qualities needed for structured play; this is because child-led activities facilitate preschool learners to work independently and lead themselves during a task (see section 2.7.1.3). When a child takes responsibility for what they would like to learn, it fosters decision making and permanency in completing the task. From the findings obtained, the participants applied tasks that enabled preschool learners to be at the forefront of the activities. In S3 and S4 for

example, this initiative consisted of selecting what preschool learners wanted to do and for learners to take action themselves. For S3 and S4, child-led activities were the result of the schools' learning approach; hence the games and resources provided were mainly child-led (see section 2.6.1; 2.6.2). After providing the necessary instructions and modelling the steps to be taken, the teachers stepped back to allow preschool learners to complete the task. Applying child-led activities, according to Yogman et al., (2018:4), allows preschool learners to take initiative, work independently and explore items on their own. The fact that preschool learners were at the forefront of the activities did not exclude teachers from guiding preschool learners during the learning experience; preschool learners were provided with continuous support to ensure they completed their work successfully (see section 2.8.1.1). Hence, the participants broke the task down into smaller units so that preschool learners could complete each step and conclude the task successfully (see section 4.4.2). The participants' application of child-led activities aligned with that of findings in the literature (see section 2.6).

### *Child's interest*

The last technique used to facilitate executive function through structured play consisted of implementing learning experiences according to *the child's interest*. According to Diamond (2012:338) "the most important element of a program might be that it involves an activity children love". From the responses obtained, most of the participants incorporated preschool learners' interests, which enabled teachers to apply tasks that were meaningful (see section 4.4.1). Dunn (1998:56), notes that preschool learners' interest are only added after negotiating with the teacher; hence, teachers and preschool learners have to agree on a topic that benefits both the learning experience, as well as stimulate children's interest. The importance of implementing learning experiences in accordance with learners' interests is that it allows children to make choices, learn about each other's interests, collaborate and practice working independently (see section 2.7.1.3). As a result, these factors promote endurance when learning, social skills and the desire to learn more about a topic. According to the findings, teachers accommodated preschool learners' interest by letting them play with the items they desired; the teachers also selected themes/games preschool learners would be most likely to want to play (see section 4.4.2.2). In S3 for example, the school follows an approach where preschool learners

direct themselves in the task they want to work with. These simple techniques made learning experiences more pleasant and worth participating in because they included choices and the selections made by preschool learners. The teaching techniques applied by the participants confirm recommendations provided by literature for play-based learning (Aronstam & Braund, 2015:2).

#### **4.5.1.2 Sub-theme 2: Teachers' roles**

The second sub-theme centres on exploring preschool teachers' roles when facilitating executive function through structured play. Findings of this theme revealed just how involved teachers were during a task, as well as the teaching techniques used to attain the necessary skills.

##### *Supervise*

One of the main roles of working in a classroom consists of *supervising* preschool learners when they are busy with any task. Literature underscores the many roles and kinds of interaction teachers must have to support learning and play; some of these roles included observing, managing and facilitating (Loizou, 2017:785; Murata & Maeda, 2002:239). Supervision, according to the participants, consisted of monitoring and observing preschool learners. Furthermore, it ensured that preschool learners performed their tasks correctly, preschool learners remained on track with the work, and ultimately completed their tasks (see section 4.4.2.4). Aligning the participants' responses in accordance with literature, Barker and Munakata (2015:92) add that the environment must respond to preschool learners' needs, as well as guard against risky activities; these techniques resonate with exercising self-regulation and inhibitory control (see section 2.7.1.3). Lastly, supervision allowed the participating teachers to have meaningful interactions with the children during activities. T5-T8 would, for example, ask preschool learners what they were busy with and how certain materials could be used; this helped teachers to understand what the child was doing and guide them to work better (see section 4.4.1.2). Ultimately, the findings reveal how supervising entails more than just looking after preschool learners; it entails examining the environment and supporting preschool learners to attain learning in the best form (see section 2.8.1.2).

### *Motivate*

Because children learn and experience activities differently, this can affect their approach to learning either positively or negatively. According to Florez (2011:51) “adults foster motivation by being motivated themselves”; hence, the role of the educator, in this case, is to help preschool learners approach learning activities with an open mind (see section 2.7.2.3). Often, during a task, preschool learners might get an answer wrong or miss a step; this can upset the child or leave them to feel like a failure. The main objective is to not have the child see themselves as a failure, but instead to focus on their abilities so that they can develop confidence (see section 4.4.1.2). In this way, teachers can help preschool learners think differently and improve themselves. From the responses obtained, the data findings corroborate the idea of giving positive feedback or awarding preschool learners with a prize/sticker to motivate children; these techniques help preschool learners feel good about their work and themselves (see section 2.7.2.3). During the study, preschool learners who receive praise and positive remarks persevered for longer and challenged the obstacles they faced. In addition, teachers who approach preschool learners with a positive attitude and with warmth encourage preschool learners to see themselves in a positive light. Literature affirms this: “a positive teacher-child relationship, that is, a relationship characterised by sensitivity and warmth, leads the child to actively engage in learning. Preschool learners who perform better at school, show better social skills and display greater motivation” (Duval et al., 2016:4). In addition, it permits preschool learners to attain academic success. Taken together, the participants’ role in motivating preschool learners during the activity corroborates the finding provided by literature (see section 2.7.2.3).

### *Alternate*

According to the findings obtained, the participants highlighted *alternating* as the ability to change/complete different tasks. Similarly, literature explains cognitive flexibility in the same light as the ability to focus on different tasks and practice working on different operations (Murata & Maeda, 2002:239; Rothlisberger et al., 2012:412). Hence, when preschool learners moved between activities, this stimulated their minds to work in different ways (see section 2.4.3). When alternating tasks, preschool learners gradually practice cognitive flexibility because they get to exercise different skills, which enhances their mental flexibility. Cognitive flexibility, according to Diamond



(2013:14), is important for learning since it builds different strengths, capabilities and enhances problem-solving skills. As a result, preschool learners are able to think differently and learn from different people/events (see section 2.4.3). The empirical data found that teachers provided different learning and playing opportunities to practice various skills (especially seen with different working stations). Although the objectives of one learning station might not be the same as those of other desks; all tasks are interconnected. In addition, the different learning stations enabled preschool learners to work with different materials and engage in different activities (TO5-TO8). If a learning experience, for example, centred around a single theme, the instructor ensured the learning experience had different activities and opportunities for preschool learners to participate in. This helped regulate preschool learners and prevented them from engaging in unnecessary activities such as wasting time, and instead, move on to the next task (see section 2.4.1; 2.4.3). According to the findings, the participants' practice is in line with what is noted in the literature, validating the teaching techniques the participants applied (see section 2.7.2.3).

#### *Assist*

The fourth role consisted of *helping* preschool learners. According to Duval et al., (2016:4) “when teachers meet the needs of the children in their class...children tend to engage more in the classroom activities proposed”. Being that preschool learners are young, they often struggle to find, lift or manoeuvre certain items; thus, the educator’s presence facilitates means to reach the learning objective (see section 2.4.5). From the answers obtained, the participants helped preschool learners meet their needs or provided suggestions to help them think of alternative ways to complete the task (see section 4.4.2.2). Assisting is important as it provides the necessary support but also guides preschool learners to meet the expected outcome. Secondly, when teachers helped preschool learners during a structured play activity, teachers showed how a task could be accomplished or how an obstacle could be overcome. It is worth noting that assisting a child does not equate to teachers completing the work for learners (see section 2.8.1.2). The child handles the task with the teacher simply assisting in those areas the child might struggle with. Similar to Vygotsky’s sociocultural theory, although the teacher scaffolds the learner to attain the necessary skills, the child remains at the forefront to decide and execute the necessary actions (see section 2.8.1.2).

## Assess

During structured play activities, teachers *assessed* preschool learners on the outcome of the learning experience and the overall learning progress preschool learners made (see Table 4.4.2.2). Similarly, literature notes the need for teachers to regularly assess the level of development (Marlowe, 2000:450; Murata & Maeda, 2002:239). This provides the opportunity for teachers to note challenges and improvements in learning and development. T5 and T7, for example, recorded the answers and the level of progress preschool learners made. Another form of assessment was noted in the lesson plans (DA1 and DA3). The participants, for example, developed questions that would enable teachers to answer whether preschool learners had achieved the learning outcome or not. Assessment is vital to teaching since it determines whether the learning goals of a learning experience had been obtained (see section 2.7.2.3). Furthermore, assessment determines the mark, placement, development and instructional needs of preschool learners. Consequently, assessment permits preschool teachers the opportunity to measure children's level of achievement in a task. It documents whether or not the learning experience objectives had taught what it was meant to have taught, determines if preschool learners achieved the objective of the learning experience, or if instructors could perhaps teach the topic more efficiently (see section 4.4.3). Similar to the metacognitive skill, assessment permits an evaluation of learning outcomes; this can be seen in section 2.8.2. Consequently, by integrating the literature and the participants' responses, the study found that teachers' form of assessing preschool learners supports literature's suggestion (Bodrova & Leong, 2013:118). It ultimately leads the assessment of preschool learners to be performed effectively.

## Probe

The last role for teachers consists of teachers *probing* preschool learners during structured play activities. Probing involves, for example, asking preschool learners questions to see if they understand their work. According to Dias and Seabra (2017:470), "several types of interaction can help promote self-regulation and autonomy; this includes using questions instead of directly intervening in any task". The purpose of probing preschool learners is that it facilitates their thinking and enhances their ability to comprehend a topic. It also allows teachers to understand reasons for preschool learners acting a certain way or exploring their ideas in

achieving the outcome (see section 2.8.2). Both the literature and the empirical study reveal the positive effects of adult-child engagements on the development of children's minds (see section 2.3). Probing provides an overall idea to see if preschool learners' actions are correctly aligned with the learning experience's objective. From the data findings, some of the teaching techniques consisted of asking preschool learners what they were doing, why they chose certain materials, why the objects differed, what they thought the information means and what would happen next (see Table 4.4.1.2). In S3 and S4 for example, as the teachers observed and followed preschool learners progress, they would find some time to step in during the task and ask some of these questions. However, in S1 and S2, the teachers probed the question of the learning experience to recap knowledge or test what preschool learners learnt from the task (see section 4.4.2.2). The idea behind probing is that it facilitates metacognitive skills as it enables preschool learners to think about their thinking and actions. As discussed in section 2.8.2, literature corroborates the teaching techniques used by the participants.

#### **4.5.1.3 Sub-theme 3: Resources**

The third sub-theme explored resources that teachers used to facilitate executive function through structured play. Findings reveal teachers' versatility in incorporating different objects during structured play games, as it included the use of recycled objects, natural objects, open and closed learning materials.

##### *Natural objects*

Natural objects such as wood, sticks, stones and leaves were often used in structured play. These were used to enhance learning experience themes; the participants utilised objects from their surrounding environment. Branches and logs, for example, were used during the theme of forestry (LO8), whereas sand was used to mould different shapes (LO1). Stones were also used to teach number concepts and skills (LO7) and leaves were incorporated to teach preschool learners the concept of seasons (LO2). The objects allowed preschool learners to engage with the items in their natural form, learn their traits and incorporate them in learning experiences to complete an activity (see section 4.4.2.4). An advantage of using natural resources includes the fact that it permitted preschool learners to work outdoors and explore the environment (see section 2.7.1.4). As preschool learners require freedom of space to

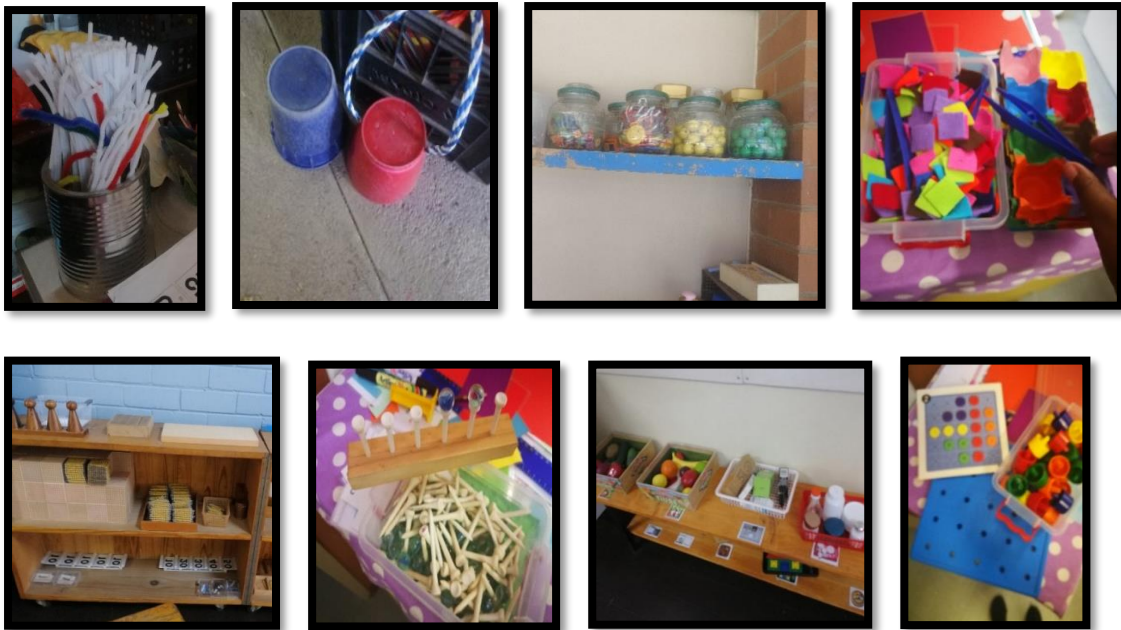
learn and explore and to work with tactile objects; this enables greater and more in-depth learning. Thus, the schools used their outdoor space to this advantage.



*Figure 4.14: Examples of natural objects*

#### *Open-ended materials/toys*

Open-ended materials enable objects and tools to be used in various ways during play (see section 2.7.1.4). These materials can be lifted, assorted, reshaped, taken apart and reassembled in different ways. With open-ended materials, the instructor determines what materials will be used and the manner in which they will be used (see section 2.7.2.3). The items used often represent other objects – for example, a bucket can be used as a chair. In the research sites, for example, teachers used various open-ended materials for obstacle courses (TO4, TO5, TO8). They permitted learning experiences to be fun, active, and creative, allowing preschool learners to express themselves. When a learning experience incorporates open-ended materials, there is little need to produce an end-product, thus minimising the chances of restricting preschool learners during play (see section 1.5.1; 1.5.3). Some of the advantages of working with open-ended materials are that it develops decision making and problem-solving opportunities in young preschool learners (see section 2.7.1.4). By working with these materials, preschool learners become creators, designers, and artists as they exercise various skills such as building, arranging, shaping and manoeuvring different objects. In relations to executive function, open-ended materials teach preschool learners how to be cognitively flexible since preschool learners operate with one object that has different functions (see section 2.4.3). Some of the open-ended materials used during indoor play/learning experiences include plastic food toys, wooden blocks, dolls, costumes, beads and LEGO® toys (see section 4.4.2.4). These permitted preschool learners to use one item in different subjects and topics.



*Figure 4.15: Examples of open-ended materials*

#### *Closed-ended materials*

All the participating schools used close-ended materials and toys. Close-ended materials have a specific objective. The materials/toys sought to develop specific outcomes such as number skills, fine motor skills and matching/assorting colours and shapes (see section 2.7.2.1; 2.7.2.2). Examples of closed-ended materials include puzzles, stationery, mazes, shape sorters and storybooks (see section 4.4.2.4). An advantage of working with close-ended materials is that it permits children to focus on a specific task (attention – executive function skill); this ultimately enables them to master a specific skill (see section 2.7.2.1). Once preschool learners attained a level of competence in one skill, they could proceed onto something else. So, in LO1 and LO2, children were allowed the time to play with puzzles. When working on a puzzle, children were not allowed to proceed with anything else until they had completed the activity. Secondly, as soon as a child had mastered a 26-puzzle set, the teacher further challenged them to complete a 36-puzzle set; consequently, this form of play-based activity taught preschool learners self-regulation and persistence in a task (see section 2.4.1). When children lost interest in completing a task, the teacher would sit with the child to help them concentrate better. Having fewer distractions enabled preschool learners to finish their tasks. These are important skills that will be of use when the child grows older (see section 2.4.5).





Figure 4.16: Examples of closed-ended materials

#### 4.5.1.4 Sub-theme 4: Challenges and benefits

The final sub-theme covers the challenges and benefits which preschool teachers experienced when facilitating executive function through structured play. Findings reveal the advantages and disadvantages during structured play activities – these are the result of internal or external factors. Thus, the following section first outlined the challenges preschool teachers experienced, followed by the benefits that came with implementing executive function through structured play.

##### *Remembering*

The first challenge the participants identified was the problem of children battling to *remember*. This is because younger children battle to sustain their attention levels for longer than ten minutes before losing focus (see section 2.4.2). Preschool learners had trouble remembering instructions or recalling work that had previously been done. Similarly, Barker and Munakata (2015:92), as well as Dhanapal et al., (2014:277) note that preschool learners get easily distracted and that this can cause the child to miss out on important information (see section 2.4.5). Observations show that the participants often had to commence their learning experiences by recapping knowledge/work that had been done previously. Secondly, during the learning experience, the teachers also had to remind preschool learners of previous learning experiences so that they could link different concepts and ultimately, attain the overall

goal. Both methods of recapping/reminding preschool learners of information exercise preschool learners' working memory (see section 2.4.2). The participants hence worked to ensure that they had preschool learners' full attention before explaining any content of the learning experience. For example, teachers sat preschool learners down, removed distractions and had resources of the topic at hand to provide an idea of the learning experience. Once the concept had been covered, teachers repeated the knowledge to instil the information that has been taught.

### *Cooperating*

The second challenge consisted of facilitating *cooperation* among preschool learners. According to Duval et al., (2016:4) "social interactions have a direct effect on the brain's ability to learn and are essential for children's cognitive development"; thus, the inability to cooperate hinders preschool learners from completing a task successfully, especially when working in pairs (see section 2.4.5). When preschool learners lack cooperation skills during tasks, this affects their self-regulating skills (see section 2.4.1). From the data obtained, few learners struggled to share toys and take turns during play; this impeded their ability to self-regulate and often compromised the opportunity for preschool learners to work effectively (T2, T4, LO8). Literature confirms this problem as Dhanapal et al., (2014:279) note that preschool learners can sometimes struggle to work with their peers during tasks (see section 1.5.3).

Thus, to tackle the problem of a lack of cooperation amongst preschool learners, the children were often paired during play activities, which offered each child the opportunity to work with different children which enabled them to practice social skills and develop self-regulation during play (see section 2.4.5). Secondly, T7 also explained the importance of teaching preschool learners to share toys or take turns during play activities. These approaches enable the child to attain their desires appropriately and learn to compromise during play. As Bodrova Germeroth and Leong (2013:113) affirmed, "engaging in self-regulated behaviours in play becomes possible because an inherent relationship exists between the roles children play and the rules they need to follow when playing", structured play provided preschool learners with the opportunity to develop cooperation skills.



### *Emotional regulation*

The third challenge described by teachers consisted of preschool learners inability to control their emotions (T4, T7). According to Sasser, Beekman and Bierman (2015:683) “oppositional-aggressive behaviours include a failure to comply with adult requests or comply with rules, as well as elevated rates of interpersonal conflict and emotional outbursts”. Similar to the data findings obtained, in some instances, children struggled to communicate their frustrations – this resulted in the child crying, throwing a tantrum or reacting physically (LO7). In other cases, a child would get annoyed if their peer interfered/disrupted their work (see Table 4.4.2.4). Being that a child envisions their work to go a certain way, any disturbances could provoke the child to feel discontent, resulting in an emotional reaction (LO8). Lastly, some preschool learners struggled to share toys and follow routines; the moment a task differed from the child’s expectation, they responded negatively (LO7). Literature affirms these findings as Sasser, Beekman and Bierman (2015:683) state that “prekindergarten children who experience a delay in executive function development may not be cognitively equipped to navigate the complex demands of the classroom environment”. This view corroborates teachers’ experiences with preschool learners battling with emotional regulation.

Participants responded to preschool learners’ outbursts by taking them aside to enquire about the problem they were experiencing. In other cases, teachers engaged with children about their feelings and frustrations (see section 2.4.5). These approaches enabled the teachers to calm children down and discuss their frustration rather than acting it out. According to Florez (2011:51) “teaching young children self-regulation first requires strong teacher self-regulation. Children learn to regulate thoughts, feelings, behaviour, and emotion by watching and responding to adults’ self-regulation”. Hence, the approaches implemented by the participants affirm the emotional regulation displayed by educators to teach children how to control their thoughts and behaviour (see section 2.4.1). Both the teacher and the child, for example, discussed appropriate ways to react to emotions which allowed children and teachers to share their experiences (TO7, LO7). These techniques assisted the learning environment to regulate emotional reactions from children.

### *Initiating*

The third challenge relates to preschool learners not taking sufficient *initiative* in their learning activity. During tasks, preschool learners sometimes relied on teachers to start the activity for them (LO1, LO2). T7, for example, discussed the challenge of not interfering with the learning process. Because they are young, children often expect adults to perform tasks for them (see section 2.8.1.2). At those times when the children lacked the effort to commence a task, the teachers motivated them to get started with their work, to take control of the activity, and demonstrated the task to the children for better understanding (see section 2.4.4). In the literature, Marlowe (2000:449) discusses the importance of conversating for preschool learners who battle with commencing or transitioning in tasks. Talking helps the child to understand what the activity is about, as well as know what they are expected to do. Teachers can also scaffold the work for preschool learners to participate in the activity. When teachers demonstrate a task, it facilitates the idea of how to work and take control of their learning (see section 2.8.1.2). By initiating learning activities, teachers provide preschool learners with a head start as well as means further explore and work independently (LO5-LO8). These practices are supported by literature (Marlowe, 2000:449) (see section 2.8.1.1).

### *Persisting*

A lack of *persistence* was one of the challenges cited by the participating teachers (see Table 4.2). Because preschool learners get easily distracted or want to engage in play other than the activities (see section 2.4.4), some preschool learners struggled to complete learning tasks (LO7, LO8). Another reason was that when children felt the activity was too challenging for them, they often wanted to give up for not being able to figure out the next step in the task (LO1). To combat this, teachers applied techniques to support preschool learners in persisting in a task. In TO1, TO2, and TO3 for example, teachers provided instructions to guide actions of completing a task. Teachers also provided alternatives when preschool learners battled with a step (TO5, TO6 and TO7). Another technique involved pairing preschool learners to help each other, which relates to Vygotsky's sociocultural theory (see section 2.8.1). The ability to work in pairs permitted brainstorming of ideas to overcome challenges and refrain from quitting if the children lost interest. Once preschool learners completed a task,

the teacher would compliment and praise a child for completing the task; this motivated preschool learners to persist and complete their work.

### *Technology*

The last challenge that was identified had to do with the role of technology in the lives of preschool learners. The participants felt that a growing number of preschool learners had become reluctant to join in physical activities (T3-T6); this is because they experience most games and forms of play on digital screens and it was reported that young children often hesitate to play outside due to digital forms of playing indoors (see section 1.5.3). As a result, teachers had to find creative means to attract and encourage preschool learners to participate in the learning activity (TO4-TO8). According to Diamond (2012:338) “executive function can be improved in children...without specialists and even without computers”. Most strategies to enhance executive function skills adopts play activities. In S4 for example, most of the learning activities occurred outside of the class, enabling preschool learners to become physically active and to learn through play. Learning experiences seldom occurred inside classrooms, allowing freedom of movement and engagement with their environment (LO7, LO8). Furthermore, none of the schools in the study made use of technological devices as teaching aids and rather depended on natural objects and toys to promote the learning of a topic (S1-S4). Literature notes that children who commence using technological devices at a young age struggle to understand social cues and find it hard to be attentive (see section 1.5.3). The child in this case hinders their own social development (due to little social engagements) and physical development (not being frequently active). Diamond (2012:337) therefore recommends that physical activities that involve both exercise and mindfulness promote social and physical development in young children; this can particularly be done through structured play (see section 1.5.1).

### *Autonomy*

One of the benefits of facilitating executive function through structured play consists of preschool learners working *autonomously* during tasks. Van Oers, Wardekker, Elbers and van der Veer (2008:15) describe it as the central point from where preschool learners can work without help from the instructor (see section 2.8.1). Structured play, for example, allowed preschool learners to figure out the next step in

the task without often relying on the educator to guide them (see section 2.8.1). In S3 for example, learning and play materials were structured in such a way that it facilitated preschool learners to complete the task on their own. Teachers, in this case, were only required to guide and observe preschool learners so that they completed the task correctly (TO5, TO6). Allowing preschool learners to master a task and work independently helps preschool learners attain cognitive and physical strengths, further enabling greater confidence and problem-solving skills (see section 2.4.5). The fact that learning activities were forms of play, permitted preschool learners to learn whilst having fun and thus, negates the idea that learning only consists of acquiring knowledge (LO7, LO8). The final factor that endorsed autonomy consists of the inclusion, by the teacher, of tasks that preschool learners were fond of; this enabled children to engage in work they wanted to do and complete the task by themselves (LO1). Taken together, the findings of the study support the literature suggestion of enhancing autonomy during play (Bodrova et al., 2013; Weisber et al., 2016; Weisberg et al., 2013).

#### *Peer assistance*

Preschool learners were very keen on assisting one another. Especially if they had managed to complete a task successfully, they were open to guiding their peers to achieve the same outcome. In the classrooms in the study, children were paired, which helped them collaborate on ideas and take turns so that both children in the pair could achieve the end goal successfully (see section 2.7.1.1). Stronger children, for example, were paired with weaker ones, which enables children to assist one another and not always depend on the teacher to provide knowledge (see section 4.4.2.4). Peer assistance relates to Vygotsky's sociocultural theory where preschool learners teach and support one another to learn a new task (see section 2.8.1). According to Diamond and Lee (2011:961) "child-to-child teaching has been found repeatedly to produce better outcomes than teacher-led instruction". Diamond (2012:338) similarly adds that the Montessori curriculum "engage children in teaching one another and foster social skills and bonding". Hence, preschool learners supporting one another provides the means for them to teach one another. This is because peer assistance exposes preschool learners to different thoughts, as well as different working operations to facilitate the completion of a task. Apart from thoughts and operations, children's communication skills are enhanced due to interaction (Aronstam & Braund,

2015:7). The ability to communicate teaches preschool learners to hear others opinions and to compromise when taking turns (see section 2.7.1.1). Taken together, peer assistance benefits preschool learners as children attain cognitive and social development; this was all enabled through structured play activities (see section 4.4.2.4).



*Figure 4.17: Examples of peer assistance*

### *Confidence*

According to teachers, preschool learners showed greater levels of confidence after completing a task (see section 4.4.1.2). This was also evident during learning experience observations when preschool learners gladly showed the task they had completed (LO1-LO4). Diamond's (2012:338) finding that play-based learning "cultivated children's joy, pride and self-confidence"; was evident in the observation conducted in all schools. Preschool learners gladly showed the tasks they managed to complete and were keen to move on to the next task (LO1-LO8). In addition, confidence allowed preschool learners to take initiative in their learning, persist in challenges and overcome their mistakes. According to Aronstam and Braund (2015:7), when children trust and like the work they do, it strengthens their minds to attain a skill faster (see section 2.7.1.1). Similarly, when preschool learners feel satisfied with the work they produce, it motivates them to work harder and explore other tasks ultimately leading them to even greater results. Literature corroborates this point as it found that preschool learners with confidence can raise a point, seek assistance and overcome challenges (see section 2.7.1.1). Taken together, confidence allowed learning success in the participating schools as preschool learners were instilled autonomy and persistence to reach the learning experience objective.

### *Communication*

The fourth benefit of facilitating executive function through structured play is that preschool learners developed greater communication skills. Diamond (2012:338), for example, found that the Montessori curriculum enhances oral language. This is because structured play enabled an opportunity for preschool learners to interact with one another (see section 2.6.1). According to Bacso and Nilsen (2017:457) factors that facilitate communicative repairs shed light on important processes through which children learn to become effective speakers. Especially with being paired (LO1-LO4), the play activities permitted preschool learners to engage with one another by engaging in interaction such as asking questions, probing each other's actions, making suggestions and discussing what needed to take place to achieve the outcome (see section 2.4.5). Moreover, teachers often probed preschool learners during the activity to find out what the child was thinking, and to make them aware of the actions they would need to take to complete the task (TO5-TO8). Probing and sharing information between the teacher and preschool learner, formed the basis of establishing relationships through play (Jensen et al., 2019:10). Without the ability to probe or engage in thoughtful discussions, preschool learners may struggle to acquire knowledge or adjust to the learning environment (see section 2.7.2.5). Dhanapal et al., (2014:272-273) found that preschool learners who can communicate their thoughts and feelings will most likely exceed academically. Hence, structured play allows preschool learners to practice communicating during the learning activity.

### *Concentration*

Concentration centres on the ability to focus on a task; this often posed a challenge because preschool children easily got distracted in class (LO3, LO4). Literature finds that when learning experiences are presented in monotonous and challenging ways, the teacher loses the ability to maintain children's attention leading them to become disengaged in the learning experience (O'Neill et al., 2012; Russell, 2015; Xiong et al., 2017). Hence, the participants incorporated structured play to support the development of order, logic, self-regulation and memory; these skills relate to concentrating abilities. Furthermore, teachers added games/tasks preschool learners were interested in to captivate their attention (TO1-TO8). By incorporating preschool learners' interests and structured play games, it stimulates eagerness and enthusiasm to participate in tasks (see section 2.7.2.5; 1.5.1). According to literature, preschool



learners' eagerness and enthusiasm is necessary for formal learning since it prepares the child to be involved in tasks and work on specific activities. These traits ultimately build confidence and steer a positive outlook when learning in school (see section 2.4.5).

### *Classroom management*

The final benefit of facilitating executive function through structured play is that it enables effective classroom management (see section 2.7.2.5). Since structured play involves that children have to abide by, teachers often regulate preschool learners' actions, as well as the time spent on the tasks (see section 2.7.2.1). Diamond (2012:338) for example, found that the Montessori curriculum minimises stress in classrooms; this is because its learning approach permit preschool learners to work independently. Similarly, executive function enables preschool learners to self-regulate, comply with the rules, follow instructions and cooperate with fellow peers (Sasser, Beekman & Bierman, 2015:682). Hence, all schools applied teaching techniques that permitted structured play activities to be managed and to direct children (S1-S4). Schedules/routines, on the one hand, provided sufficient time for preschool learners to play but also complete their work activities; whereas structured play regulated just how preschool learners played; this was to ensure the learning experience attained specific outcomes and preschool learners were not left idle (see section 2.7.2.1). Marais and Meier (2010:43) point out that various attributes cause behavioural problems in class; structured play regulates learning and play, keeping preschool learners from unnecessary activities and ultimately minimises behavioural problems in class (see section 2.7.2.1). In relations to the study, when structured play directs learning and behaviour in tasks, it develops social and emotional skills which consequently facilitate preschool learners to attain academic success (see section 2.7.2.1).

## **4.6 SUMMARY OF THE CHAPTER**

This chapter explored the role of structured play in facilitating preschool learners' executive function. It presents the findings obtained for the research question: *how preschool teachers can facilitate executive function through structured play*. Consequently, the study developed four sub-themes, from which the main theme was



derived. Both the main and sub-themes revealed how participating preschool teachers develop preschool children's executive function skills through structured play.

The information obtained in the chapter discussed types of structured play games and the resources used during play. Lesson observations and document analysis provided a greater depth towards understanding the planning and implementation of structured play activities to enhance executive function skills. Despite teachers sharing the benefits of implementing executive function through structured play, this also presented the challenge of short memory, learner cooperation, emotional regulation and persistence experienced by preschool learners. These challenges interfered with the learning outcome and classroom regulation. Thus, to successfully implement executive function through structured play, teachers need to realize the complexities that surround executive function and structured play. This would enable educators to apply proper teaching techniques, as well as activities that support executive function through structured play. In the next chapter, a comparison of the research findings with the literature is presented.

## **CHAPTER 5: COMPARISON OF THE RESEARCH FINDINGS WITH THE LITERATURE**

### **5.1 INTRODUCTION**

Chapter 4 outlined the process of analysing the different data sets, such as semi-structured interviews (with a board game), observation of teachers and children, as well as document analysis of lesson plans. The analysis culminated in a main theme with four sub-themes on how structured play facilitates preschool learners' executive function. This chapter presents the summary of literature together with the empirical research findings. It includes four tables that discuss the supportive evidence, contradictions, silences, as well as new insight of the study's data against literature. The chapter then ends with a summary of what the chapter covered.

### **5.2 SUMMARY OF THE LITERATURE AND EMPIRICAL RESEARCH FINDINGS**

In analysing the themes and sub-themes alongside the existing literature, four tables were developed to convey the supportive evidence, contradictions, silences, and new insights according to the study's findings and to contrast these with the literature on the topic. According to Creswell (2014:200), the ability to compare findings with existing literature is necessary for a qualitative study; this is because the findings note valuable contributions towards understanding a topic. I denoted the literature review (Chapter 2) which focuses on understanding the elements of executive function and structured play; and weighted it against the findings of my study.

#### **5.2.1 Comparison of findings with existing knowledge: supportive evidence**

As mentioned, four tables were developed to show the supportive evidence, contradictions, silences and new insights; and to show how literature corroborated the study's findings on facilitating executive function through structured play (Agbagbla, 2018; Ebersöhn, 2009). The first table (Table 5.1) discusses the supportive evidence of the existing knowledge against the findings of the study.

Table 5.1: Comparison of findings with existing knowledge: supportive evidence

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
<p><b>MAIN THEME:</b> Enhancing executive function through structured play</p> <p><b>SUB-THEME 1: Teaching techniques</b></p> <ul style="list-style-type: none"> <li>• guiding</li> <li>• modelling</li> <li>• instructing</li> <li>• repeat/recapping</li> <li>• child-led activities</li> <li>• child's interest</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Guiding:</b> guiding preschool learners means ensuring they follow the necessary actions and are on the track of achieving the learning outcome; this technique also entails scaffolding preschool learners during tasks (Harvard, 2011; Roebbers, 2017; Robertson, Morrissey &amp; Rouse, 2018).</li> <li>• <b>Modelling:</b> when modelling, preschool learners are required to observe the instructor's actions and steps. Teachers get to teach by an explanation (Florez, 2011; Bodrova &amp; Leong, 2015; Stavrou, 2019).</li> <li>• <b>Instructing:</b> instructions should be simple, easy to follow and remember. There should be adequate explanation of the task where the teacher gradually provides information (Fitzpatrick, 2014; Sasser, Beekman &amp; Bierman, 2015; Brown, 2008).</li> <li>• <b>Repeat/recapping:</b> repetition enables teachers to remind children of the learning objectives, the actions they need to take or vital information of a topic. Children are also allowed to repeat actions as a practice to get the steps right (Blair, 2016; Kok, Kong &amp; Bernard-Opitz, 2002).</li> </ul>	<p>In the interviews, the participants stated that they would present the task, allow preschool learners the chance to explore the activity/resource, instruct them how to go about it if preschool learners were not sure of how to proceed, and always use items that grabbed the children's attention.</p> <p>When observing the learning experiences, I saw that the participants applied methods such as outlining what needed to be done (instructing) T1; T3; counting and rhyming together (repetition) T4; physically show the activity (modelling) T2; point the child in a particular direction (guide), and apply activities that preschool learners loved to do (TO5-TO8).</p> <p>Thus, the information obtained from participants corroborates literature's findings.</p>	<p>The techniques used to support preschool learners during play allow teachers to be just as involved during play but also gives preschool learners the responsibility to complete tasks themselves. The techniques enable preschool learners to depend less on the teacher and cultivate their learning.</p> <p>For this to occur, teachers need to plan the learning activity in such a way that preschool learners can attain specific skills with minimal interference from the teacher.</p> <p>Lastly, the techniques teachers apply should be stated/shown in ways preschool learners can understand so that preschool learners feel confident and strengthened to achieve it.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
	<ul style="list-style-type: none"> <li>• <b>Child-led activities:</b> these consist of games/tasks that place children at the forefront of completing the task, for example, building puzzles. Teachers provide conditions for independent choice, encourage children to make their own decisions, and take initiative during games (Barker &amp; Munakata, 2015; Lillard, 2011).</li> <li>• <b>Child's interest:</b> teachers should be aware of the culture, language and needs of preschool learners to determine their interests (Duval et al., 2016).</li> </ul>		
<p><b>SUB-THEME 2: Teachers' roles</b></p> <ul style="list-style-type: none"> <li>• supervise</li> <li>• motivate</li> <li>• alternate</li> <li>• assist</li> <li>• assess</li> <li>• probe</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Supervise:</b> teachers observe children's interactions with objects and fellow peers, their performance, and social settings. This helps plan and develop play activities (Ackerman &amp; Friedman-Krauss, 2017; Bodrova, Germeroth &amp; Leong, 2013; Stavrou, 2019).</li> <li>• <b>Motivate:</b> the activity should appeal to preschool learners' interest. Furthermore, communicating positively and encouraging preschool learners boosts their morale. Rewards also act as incentives to have preschool learners participate (Fleer et al., 2017; Weisberg et al., 2016).</li> <li>• <b>Alternate:</b> provide various tasks to exercise flexibility and support different</li> </ul>	<p>From the interviews, the participants stated that their roles included supervising, observing, directing how the activity would occur, and then probing preschool learners on the activity they were doing (T1, T3, T6, T7, T8).</p> <p>When I observed the learning experiences, the teachers' actions confirmed the role they played. For example, the participants provided more challenging tasks, maintained preschool learners' motivated, modelled the correct behaviour, observed their work and guided children who</p>	<p>Teachers are directly and indirectly involved during the learning task. The presence of the educator is vital as it steers preschool learners in the right direction; furthermore, it ensures that the learning outcome is attained.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
	<p>skills. Activities should consist of various resources (Blair 2016; Heerden, 2016).</p> <ul style="list-style-type: none"> <li>• <b>Assist:</b> support can be provided when teachers provide adequate explanations. Also offer alternatives/suggestions for when preschool learners encounter difficulties (Ackerman &amp; Friedman-Krauss, 2017; Harvard, 2011).</li> <li>• <b>Assess:</b> through observing, teachers can determine the level and capabilities of preschool learners (Li, Nyland, Margetts &amp; Guan, 2017; Laevers, 2011).</li> <li>• <b>Probe:</b> probing entails speaking and engaging with the child; for example, teachers can ask preschool learners to explain certain concepts or discuss the materials they are using. Teachers are also encouraged to challenge children's thoughts or actions to increase thinking and communication skills (Best &amp; Miller, 2010; Russell, 2015).</li> </ul>	<p>struggled (see section images 4.6).</p> <p>The participants also explained and arranged the learning experience effectively for children to learn effectively.</p> <p>Therefore, the findings are concurrent with literature, as the interviews, observations and photographs align with what literature shares.</p>	
<p><b>SUB-THEME 3: Resources</b></p> <ul style="list-style-type: none"> <li>• natural objects</li> <li>• open-ended materials</li> <li>• closed-ended materials</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Natural objects:</b> natural objects consist of natural items from the earth; these include sticks, sand or leaves (Weisberg et al., 2016).</li> <li>• <b>Open-ended materials/toys:</b> include material/toys that have more than one purpose, for example, a ball, cards or recycled materials (Monette, Bigras &amp;</li> </ul>	<p>All the schools are rich in resources (S1-S4); this is because the schools used various materials in relations to the activity. S1-S3 often used closed-ended toys, whereas S4 utilised artistic and open-ended materials.</p>	<p>Preschool learners need to be exposed to various materials as this will strengthen their cognitive skills. Furthermore, in working with different resources, preschool learners' fine and gross motor skills are enhanced,</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
	<p>Lafreniere, 2015; Johnson, Christie &amp; Wardle, 2005; Brown, 2008; Macdonalds et al., 2016).</p> <ul style="list-style-type: none"> <li>• <b>Closed-ended materials/toys:</b> these are materials/toys that can only be used in a specific way, for example, puzzles, board games, and costumes (Yogman et al., 2018; Petty &amp; Coelho de Souza, 2012; Thibodeau et al., 2016).</li> </ul>	<p>Thus, the findings are in accordance with the existing literature.</p>	<p>enabling the overall development of the child.</p>
<p><b>SUB-THEME 4: Challenges and benefits</b></p> <p><b>Challenges:</b></p> <ul style="list-style-type: none"> <li>• Remembering</li> <li>• Cooperating</li> <li>• Emotional regulation</li> <li>• Initiating</li> <li>• Persisting</li> <li>• Technology</li> </ul> <p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• Autonomy</li> <li>• Peer assistance</li> <li>• Confidence</li> <li>• Communication</li> <li>• Concentration</li> <li>• Classroom management</li> </ul>	<ul style="list-style-type: none"> <li>• The challenges include preschool learners battling to pay attention, to self-regulate during tasks and to follow instructions (Stavrou, 2019; Singer, Golinkoff &amp; Hirsh-Pasek, 2006; Marais &amp; Meier, 2010).</li> <li>• The benefits include that preschool learners work independently, develop confidence and manage themselves better in class to permit effective learning (Fitzpatrick, 2014; Harvard University, 2011; Blair, 2016).</li> </ul>	<p>The participants noted various challenges and benefits when developing executive skills through structured play.</p> <p>The challenges included remembering (T2, T3), the struggle to share (T2), doubt/negativity (T4), and the constant use of technological devices (T5).</p> <p>Benefits include preschool learners becoming more responsible (T1), gaining confidence, self-regulation and providing peer assistance (T2). The findings are inevitably confirmed.</p>	<p>There are advantages and disadvantages experienced when facilitating executive function through structured play. Teachers have to have measures in place to overcome barriers that could present during learning experiences. The benefits, however, far outweigh the challenges and promote better learning.</p>

(Adapted from Agbagbla, 2018; Ebersöhn, 2009).

The existing literature largely corroborates the findings of the study which demonstrates how knowledgeable educators can facilitate executive function skills through structured play (Shaheen, 2014; Harvard University, 2015; Diamond, 2012; Bodrova, Germeroth & Leong, 2013; Bodrova & Leong, 2007; Bodrova & Leong, 2015; Murata & Maeda, 2002; Barker & Munakata, 2015). From what the participants mentioned, there are various ways to facilitate executive function through structured play. Furthermore, the benefits and learning materials were often similar in all schools; hence, the training of executive function can be performed in similar ways despite the schools following different curriculums (Stavrou, 2019; Singer et al., 2006; Marais & Meier, 2010; Fitzpatrick, 2014; Harvard University, 2011; Blair, 2016). The participants also discussed their roles during structured play – this corroborates what literature recommends: observing, alternating, communicating, and assessing preschool learners' performance (Loizou, 2017; Murata & Maeda, 2002; Petty & Coelho de Souza, 2012; Russell, 2015; Florez, 2011; Ackerman & Friedman-Krauss, 2017). Taken together, the teachers in this study demonstrated how they apply suitable teaching techniques to enhance executive function through structured play and so, to stimulate preschool learners' cognitive skills in different ways. Applying the correct teaching techniques to develop executive function, enables better teaching and learning in school. Consequently, executive function is enhanced through structured play as the participants applied similar methods in their learning experiences. The next table looks at the contradictory evidence found.

### **5.2.2 Comparison of findings with existing knowledge: contradictory evidence**

While Table 5.1 (see section 5.2.1) discusses the supporting evidence of the findings against literature, Table 5.2 outlines the contradictory evidence of enhancing executive function through structured play. The contradictory evidence is a summary of the literature review against findings of the study as encapsulated in the main theme as well as sub-themes. The existing knowledge, for example, relates to the literature of executive function and structured play discussed in chapter 2 (see section 2.4 and 2.7.2); whereas the findings column summarises the empirical data obtained from interviews, observation and documents (see section 4.4.1; 4.4.2 and 4.4.3). Lastly, the interpretive discussion combines learning experiences from both literature and the participants' findings when facilitating executive function through structured play.



Table 5.2: Comparison of findings with existing knowledge: contradictory evidence

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
<p><b>MAIN THEME:</b> Enhancing executive function through structured play</p> <p><b>SUB-THEME 1: Teaching techniques</b></p> <ul style="list-style-type: none"> <li>• guiding</li> <li>• modelling</li> <li>• instructing</li> <li>• repeat/recapping</li> <li>• child-led activities</li> <li>• child's interest</li> </ul>	<p>Literature states that structured play activities should be teacher-led meaning that the activities are often guided by the instructors (Kwon et al., 2013; Berry et al., 2008; Kok et al., 2002). This contradicts the findings that state structured play should also apply child-led activities (Barker &amp; Munakata, 2015; Blair &amp; Raver, 2014).</p> <p>Secondly, when preschool learners are at the forefront of a task, according to the scaffolding technique, teachers ought to only provide guidance/modelling if preschool learners find themselves struggling (Ackerman &amp; Friedman-Krauss, 2017; Florez, 2011).</p> <p>Structured play, however, necessitates teachers to model and instruct children prior to commencing the activity (Barker &amp; Munakata, 2015; Blair &amp; Raver, 2014). In Montessori schools, teachers do not instruct children but rather observe and guide them (Aronstam &amp; Braund, 2015; Lillard, 2012).</p> <p>Finally, literature affirms that computerised games improve</p>	<p>Although teachers provide instruction and guided children during structured play, children were required to be at the forefront of completing a task (LO1-LO8). This implied preschool learners taking initiative and depending less on the teacher when participating in the activity (T3, T4). In schools S3 and S3 for example, preschool learners were allowed to decide what games and actions they wanted to take without their teacher's assistance (TO5-TO8). Secondly, in S3 and S4, modelling was often done after allowing children to explore if they could work without assistance.</p> <p>Furthermore, according to T5 "because technology is not real, it doesn't always give children real-life experiences". The participants found that computerised games do not provide the real-life experiences which preschool learners need for learning. Consequently, the findings contradict the existing knowledge.</p>	<p>There has to be a balance between teacher-led versus child-led activities. After determining the objectives of the learning experiences, teachers need to evaluate what children know and can do on their own. If children require assistance, teachers should be ready to aid the child.</p> <p>Secondly, it would be recommended to implement computerised games that apply real-life tasks. Ensure that the learning objective of the game facilitates executive function in preschool learners, and teachers provide a balance between computerised games real-life active games.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
	<p>executive function (Parong et al., 2017; Blakey &amp; Carroll; 2015; Fitzpatrick, 2014). Diamond (2012:338) however noted that “executive function can be improved in children...without specialists and even without computers”.</p>		
<p><b>SUB-THEME 2: Teachers’ roles</b></p> <ul style="list-style-type: none"> <li>• supervise</li> <li>• motivate</li> <li>• alternate</li> <li>• assist</li> <li>• assess</li> <li>• probe</li> </ul>	<p>According to literature, probing assist teachers to know how and why preschool learners work in a particular way; however, probing would also result in stimulating preschool learners’ metacognitive skills – thinking about one’s thinking, therefore instigating reasoning in their thoughts and actions (Ackerman &amp; Friedman-Krauss, 2017; Jensen et al., 2019; Lillard, 2011; Weisberg et al., 2013).</p> <p>Secondly, probing, assessing, assisting and supervising are interrelated as they enable quiet observations and assessments during activities (Best &amp; Miller, 2010; Lillard &amp; Else-Quest, 2006; Russell, 2015).</p>	<p>Regarding contradictions from the participants’ responses, probing, motivating and assisting were the three factors that differed. Beginning with probing, with T5 and T6, there was little interaction during an activity. The teachers preferred to only show what needed to be done; questions were hardly ever asked during a task. All that the children needed to do was to follow the teacher’s example.</p> <p>Contrary to T5 and T6, T3 and T4 stated that verbal engagement (which includes probing and discussions) is necessary for learning. Teachers often asked preschool learners the reason for their choice and even praised them when they did well or when they completed a task (T1-T4).</p>	<p>Concerning computerised games, preschool learners should hear and see that the teacher is pleased with the work they have done. The interaction, however, should not distract the child from completing their work. Verbal engagement needs to be sufficient to motivate the child to try their best, as well as complete the task in the way that the teacher instructed.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
		<p>TO3 and TO4s approach is different to T5 and T6. This is because TO5 and TO6 confirmed that the Montessori learning approach does not encourage appraisal so that children are less dependent on external motivation.</p> <p>Lastly, in assisting preschool learners, the children in S3 and S4 were found to be less dependent on teachers as the activities were often child-centred.</p>	
<p><b>SUB-THEME 3: Resources</b></p> <ul style="list-style-type: none"> <li>• natural objects</li> <li>• open-ended materials</li> <li>• closed-ended materials</li> </ul>	<p>Although natural and open-ended materials can be used during structured play games (Fitch, 2013; Ozerem &amp; Kavaz, 2013; Mooney, 2013; Thornton &amp; Brunton, 2015); close-ended toys most often enhance executive function.</p> <p>The toys include board games, puzzles, toy sets, tower blocks and shapes (Petty &amp; Coelho de Souza, 2012; Yogman et al., 2018; Best &amp; Miller, 2010).</p>	<p>S1, S2 and S4 mostly made use of open-ended materials: these consist of items that can be used in different ways. S3 however, often made use of closed-ended toys because the school followed the Montessori approach (LO5, LO6).</p> <p>The Montessori school applied items that develop specific executive function skills; however, not all schools used the same resources.</p>	<p>Teachers are free to use any material/items they desire in a learning experience, as long as it falls within the constructs of facilitating structured play.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
<p><b>SUB-THEME 4: Challenges and benefits</b></p> <p><b>Challenges:</b></p> <ul style="list-style-type: none"> <li>• Remembering</li> <li>• Cooperating</li> <li>• Emotional regulation</li> <li>• Initiating</li> <li>• Persisting</li> <li>• Technology</li> </ul> <p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• Autonomy</li> <li>• Peer assistance</li> <li>• Confidence</li> <li>• Communication</li> <li>• Concentration</li> <li>• Classroom management</li> </ul>	<p>Literature notes that preschool learners require peer/social interaction to attain executive function (Dishion, 2016; Holmes, Kim-Spoon &amp; Deater-Deckard, 2016; Sasser et al., 2015; Shoemaker et al., 2013 Bienavides-Nieto et al., 2016).</p> <p>Contradicting this is the Montessori approach which often relies on preschool learners working independently; the approach is deemed to be one of the best curricula to enhance executive function (Ackerman &amp; Friedman-Krauss, 2017; Barker &amp; Munakata, 2015; Diamond &amp; Lee, 2011; Lillard, 2012; Lillard &amp; Else-Quest, 2006).</p>	<p>Though T3 found that LO3 lacked cooperative skills; however, LO1 and LO2 were keen to assist one another. Secondly, T2 found that preschool learners forgot easily, whereas TO5 said that the children concentrated better with play.</p> <p>Preschool learners were able to work independently (TO4, LO5, LO6); however, others worked better in pairs to obtain peer assistance (TO1, LO1, LO2).</p> <p>Lastly, some of the children struggled to regulate their emotions which, in one case, resulted in a child having an outburst (LO7). T4 however, found that preschool learners were able to express themselves better leading to greater self-regulation.</p>	<p>If preschool learners often work independently, there is little room to exercise peer assistance and improve their communication skills.</p> <p>Secondly, structured play entails being led by the instructor. Thus, children depend on the teacher to understand how the task ought to be done.</p> <p>Most of the challenges identified during learning experiences can be overcome by the benefits of attaining executive function. Teachers need to ensure the approach or technique that facilitates executive function can overcome the obstacles to improve learning in the classroom.</p>

(Adapted from Agbagbla, 2018; Ebersöhn, 2009).

Contradictions are often found in events because people hardly ever experience events the same way. In the study, the teachers and children did not experience executive function through structured play in the same way. Whilst some teachers might have seen it as beneficial to motivate and probe preschool learners (TO1-TO4), others did not (TO5-TO6). Literature affirms that, since executive function forms part of a broader umbrella (various cognitive and behaviour skills), its skills can be attained in different ways (Ackerman & Friedman-Krauss, 2017; Barker & Munakata, 2015; Diamond & Lee, 2011). Secondly, the contradictions were also the result of the different learning approaches used by the schools. The participating schools each had their curriculum/learning approaches; thus, their methods of teaching and facilitating executive function through structured play sometimes differed. Consequently, the findings cannot be generalised; instead, the study offers a view of a unique set of experiences. Furthermore, the contradictions demonstrate further investigation that needs to be done. Future studies could investigate the various discrepancies to get a better understanding of the subject. The next section outlines the silences and gaps the study identified.

### **5.2.3 Comparison of findings with existing knowledge: silences and gaps**

Table 5.3 outlines the silences/gaps from literature and the study's findings. These silences and gaps highlight information that has not been addressed, thus requiring further exploration. The column of existing knowledge (Table 5.2) details the silences within the literature that was discussed in chapter 2 (see section 2.6.1 and 2.6.2) against findings of the study; this was done in accordance with the study's theme as well as sub-themes. Secondly, the findings column below (Table 5.3) summarises the empirical data obtained from interviews, observation, and documents (see section 4.4.1; 4.4.2 and 4.4.3). Lastly, the interpretive discussion combines learning experiences from both literature and the empirical data towards facilitating executive function through structured play.

Table 5.3: Comparison of findings with existing knowledge: silences and gaps

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
<p><b>MAIN THEME:</b> Enhancing executive function through structured play</p> <p><b>SUB-THEME 1: Teaching techniques</b></p> <ul style="list-style-type: none"> <li>• guiding</li> <li>• modelling</li> <li>• instructing</li> <li>• repeat/recapping</li> <li>• child-led activities</li> <li>• child's interest</li> </ul>	<p>The literature discusses ways to enhance executive function in young children; many times, it does not specify the techniques teachers ought to use during play (Diamond, 2012; Duval et al., 2016; Harvard University, 2015; Esterhuizen &amp; Grosser, 2014; Blair, 2016; Ackerman &amp; Friedman-Krauss, 2017; Dias &amp; Seabra, 2017; Halperin et al., 2012; Fleer et al., 2017).</p>	<p>The study analysed lesson plans to understand the idea behind planning executive function through structured play (DA1-DA8).</p> <p>The participants (except for DA3) battled to link the curriculum outcomes in relations to executive function skills; hence, literature needs an existing guideline to show educators how this can be done.</p>	<p>Literature needs to provide more ideas around enhancing executive function through structured play and support the training of educators to facilitate the skill through play. Hence, the study sought to address this gap by providing examples of how preschool teachers implement this work.</p>
<p><b>SUB-THEME 2: Teachers' roles</b></p> <ul style="list-style-type: none"> <li>• supervise</li> <li>• motivate</li> <li>• alternate</li> <li>• assist</li> <li>• assess</li> <li>• probe</li> </ul>	<p>More examples need to be given so that teachers understand their role during play and provide room for preschool learners to build executive function.</p> <p>Vygotsky's Zone of Proximal Development in this case enable teachers to scaffold their preschool learners through assisting, alternating, as well as probing their thoughts and actions to facilitate cognitive growth. Preschool learners are guided but also given room to grow (Haney &amp; Bissonette, 2011; Bodrova &amp; Leong; 2015; Murata &amp; Maeda, 2002; Florez, 2011).</p>	<p>T7 for example discussed the difficulty in stepping back when preschool learners are struggling during a task. Educators sometimes feel the urgency to complete the work on behalf of preschool learners due to time pressures and bringing the child up to speed.</p>	<p>Apart from setting objectives for children, teachers also need to set objectives they ought to reach for the learning outcome. In this case, teachers need to outline the actions teachers ought to complete whilst preschool learners engage in the activity.</p>

THEME AND SUB-THEMES	EXISTING KNOWLEDGE	FINDINGS	INTERPRETIVE DISCUSSION
<p><b>SUB-THEME 3: Resources</b></p> <ul style="list-style-type: none"> <li>• natural objects</li> <li>• open-ended materials</li> <li>• closed-ended materials</li> </ul>	<p>Literature provides examples of how items can be used during structured play; however, it lacks description on the kinds of resources, toys and LTSM that can specifically enhance executive function skills (Department of Basic Education, 2019; Duval et al., 2016; Petty &amp; Coelho de Souza, 2012; Kwon et al., 2013; Berry Abernethy &amp; Cote, 2008; Servin, Bohlin &amp; Berlin, 1999).</p>	<p>According to S1 and S2, certain items/toys were no longer allowed to be played with due to the COVID-19 pandemic. Hence, the participants had to find alternative games/toys preschool learners could engage with that would still strengthen executive function (T1-T4).</p>	<p>Teachers need to know the distinction between open-ended and closed materials so they can vary the learning items used during play.</p> <p>Furthermore, the recommendations should guide learning experiences to work with specific materials and practice the training of executive function.</p>
<p><b>SUB-THEME 4: Challenges and benefits</b></p> <p><b>Challenges:</b></p> <ul style="list-style-type: none"> <li>• Remembering</li> <li>• Cooperating</li> <li>• Emotional regulation</li> <li>• Initiating</li> <li>• Persisting</li> <li>• Technology</li> </ul> <p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• Autonomy</li> <li>• Peer assistance</li> <li>• Confidence</li> <li>• Communication</li> <li>• Concentration</li> <li>• Classroom management</li> </ul>	<p>Various works discuss the benefits of attaining executive function skills through play. However, the challenges are not adequately discussed especially when implementing executive function through play-based activities (Petty &amp; Coelho de Souza, 2012; Harvard University, 2015; Thibodeau et al., 2016; Shaheen, 2014; Shaul &amp; Schwartz, 2014).</p>	<p>The participants were asked about the importance of attaining executive function through structured play. All the participants (T1-T8) noted its importance revealing the benefit executive function has on learning.</p> <p>Most of the challenges preschool learners experienced consisted of emotional regulation, memory and communication problems (T1-T8). Literature does not often discuss the problems encountered during play.</p>	<p>Literature needs to outline challenges experienced by educators so further studies can address these problems. In relations to benefits, literature cannot emphasise enough how vital executive function through play-based games improves school readiness and academic success. Hence, many preschools strive to implement play-based learning in their teaching approach.</p>

(Adapted from Agbagbla, 2018; Ebersöhn, 2009).



The silences and gaps in both the existing knowledge and findings indicate further research that needs to be conducted. Given that the topic of teaching executive function is very broad, there are emerging areas yet to be explored. One of them includes the areas of play-based learning that enhance executive function. Secondly, the National Curriculum Framework does not explicitly address executive function nor guide teachers on how to incorporate play-based learning (for example structured play) to enhance any executive function skills. The policy curriculum document needs to discuss the intricacies between the Early Learning Development Areas, executive function and structured play more (Department of Basic Education, 2015:4;14). Literature should provide more ideas to develop executive function through, for example, a guide that provides suggestions on the kind of games, resources and even teaching techniques to enhance the skill; these ideas would be shared and practised in various learning settings. Lastly, as the study points out various challenges that arise when exercising executive function through play-based teaching, the findings reveal necessary support that can be implemented to overcome these challenges. The next section outlines the insight and knowledge that came about as a result of this research.

#### **5.2.4 Comparison of findings with existing knowledge: new insight and knowledge**

Table 5.4 shows the new insights and knowledge the study generated and areas that might warrant further research. The left column within Table 5.4 outlines the study's themes and sub-themes. The middle column – description, proceeds to describe the findings obtained from the study (combination of the literature review together with the empirical data). The last column – interpretive discussion (Table 5.4, right column) discusses learning experiences that can be taken to enhance executive function through structured play.

Table 5.4: Comparison of findings with existing knowledge: new insights and knowledge

THEME AND SUB-THEMES	DESCRIPTION	INTERPRETIVE DISCUSSION
<p><b>MAIN THEME:</b> Enhancing executive function through structured play</p> <p><b>SUB-THEME 1: Teaching techniques</b></p> <ul style="list-style-type: none"> <li>• guiding</li> <li>• modelling</li> <li>• instructing</li> <li>• repeat/recapping</li> <li>• child-led activities</li> <li>• child's interest</li> </ul>	<p>Play promotes learning and it is evident that preschools are moving towards incorporating play-based learning to facilitate knowledge, skills and values in preschool learners (S1-S4).</p> <p>Secondly, few of the participating teachers were aware of how to link executive function according to the NCF requirements; this resulted in teachers not making use of teaching opportunities that would have enhanced executive function.</p> <p>Play increased child participation as preschool learners engaged in the learning activities, as well as assisted their fellow peers; this instilled the spirit to collaborate and regulate behaviour during tasks.</p> <p>With preschool learners particularly acquiring executive function through structured play, the children attained the learning outcomes and developed various skills. Consequently, the participants proved to be knowledgeable when implementing structured games to enhance executive function.</p>	<p>Preschool learning should be more play-oriented as this has been found to teach, as well as develop various skills. Literature on how curriculum and policy speak to executive function or structured play is limited. Thus, a guideline - such as the one developed in this study (Table 5.5) - indicate various forms and techniques teachers can exercise executive function through structured play.</p>
<p><b>SUB-THEME 2: Teachers' roles</b></p> <ul style="list-style-type: none"> <li>• supervise</li> <li>• motivate</li> <li>• alternate</li> <li>• assist</li> </ul>	<p>Initial Teacher Education courses, as well as workshops that promote continuous development should focus on:</p> <ul style="list-style-type: none"> <li>• planning and organising learning experiences around structured play</li> <li>• exercising various executive function skills</li> </ul>	<p>Educators play a vital role during learning experiences; thus, teachers need to be aware of the various roles that exist when facilitating executive function through structured play; as well as considering the role lesson plans have to develop executive function.</p>

THEME AND SUB-THEMES	DESCRIPTION	INTERPRETIVE DISCUSSION
<ul style="list-style-type: none"> <li>• assess</li> <li>• probe</li> </ul>	<ul style="list-style-type: none"> <li>• using indoor and outdoor learning spaces to promote executive function</li> <li>• applying active games for physical development</li> <li>• teacher-led versus child-led activities</li> <li>• alternating activities to enhance executive function</li> <li>• managing disruptive behaviour during play</li> <li>• inclusion and tolerance during play</li> </ul>	<p>The study, for example, included lesson plans to indicate how learning experiences could commence, what to do during the period, and how to complete an activity using structured play. The documents ultimately provided a summary of how early year teaching practices can align with developing/improving executive function.</p>
<p><b>SUB-THEME 3: Resources</b></p> <ul style="list-style-type: none"> <li>• natural objects</li> <li>• open-ended materials</li> <li>• closed-ended materials</li> </ul>	<p>There is limited literature on materials/toys that are specifically designed to enhance executive function through structured play. Therefore, literature should provide more guides to:</p> <ul style="list-style-type: none"> <li>• show existing materials used for games</li> <li>• show creative ways of designing resources</li> <li>• explore how the environment can supply different items</li> <li>• show how open-ended and closed-ended materials facilitate executive function</li> <li>• show how teachers can use store-bought items or natural objects for play</li> </ul>	<p>In structured play activities, almost any material can be used to enhance executive function; these items can be bought, made or even recycled. The study addressed the gaps that include: showing creative ways of developing learning materials that would enhance executive function, showing how open-ended and closed-ended materials facilitate executive function, show how teachers can use store-bought items as well as natural objects during play (picture 4.5). Before utilising any material/toy, it is imperative that teachers assess if the item can enhance executive function skills.</p>
<p><b>SUB-THEME 4: Challenges and benefits</b></p> <p><b>Challenges:</b></p> <ul style="list-style-type: none"> <li>• Remembering</li> </ul>	<p>ITC and technology can both promote and hinder preschool learners from attaining executive function skills.</p>	<p>Preschool teachers need to be equipped with knowledge and skills of enhancing executive function through structured play. A guideline, such as the one developed in this study (Table</p>

THEME AND SUB-THEMES	DESCRIPTION	INTERPRETIVE DISCUSSION
<ul style="list-style-type: none"> <li>• Cooperating</li> <li>• Emotional regulation</li> <li>• Initiating</li> <li>• Persisting</li> <li>• Technology</li> </ul> <p><b>Benefits:</b></p> <ul style="list-style-type: none"> <li>• Autonomy</li> <li>• Peer assistance</li> <li>• Confidence</li> <li>• Communication</li> <li>• Concentration</li> <li>• Classroom management</li> </ul>	<p>Secondly, self-regulation posed to be one of the problems during play; hence, structured play together with executive function reinforced the idea of exercising self-regulation during play/learning engagements. The basic principle of preschool learners exercising executive function helped manage disruptive behaviour. With teachers training executive function, it improved preschool learners ability to behave during tasks and integrate with fellow peers.</p> <p>The study also noted tension between children working independently and them getting the necessary assistance. Teachers, in this case, had to thoroughly plan the play activity and present the task in a comprehensive form.</p> <p>The last matter related to the COVID-19 pandemic. Preschool learners found themselves using technology more frequently as they were not allowed to play/come in contact with toys and materials. The learning experiences had lesser social interactions removing the ability to cooperate and develop social skills. The use of technology in this case increased with children facing more screen time and less opportunity to engage in physical play.</p>	<p>5.5; 5.6; 5.7), will guide preschools to train executive function in different ways, particularly emphasizing structured play.</p> <p>Although the introduction of executive function through structured play may evoke learning obstacles, future studies can explore ways to overcome these problems. It is important that teachers share their experiences as it will establish a learning community for various preschool teachers.</p> <p>With teachers and children having been forced to adjust to online learning, teachers can provide a balance between using digital screens to enhance a learning skill such as executive function using computerised games. In this way, executive function can be exercised no matter the circumstance currently being faced.</p>

(Adapted from Agbagbla, 2018; Ebersöhn, 2009).

Looking at the supportive evidence, the contradictions, the silences and the new insights, I consequently developed guidelines (Table 5.5; 5.6; 5.7) to illustrate how executive function can be identified in the curriculum outcomes, identify the types of structured play games that enhance executive function, and provide ideas of resources that can enhance executive function in preschool. The guidelines hope to enlighten preschool teachers to:

- Understand how executive function can be attained according to the curriculum policy (NCF) and play-based learning.
- Enhance learning and the acquisition of executive function through structured play.
- Identify opportunities to participate in structured play that facilitates executive function that include movement activities.
- Encourage and create opportunities for learning through structured play preschool learners experience as fun, engaging, hands-on and interesting.

I combined literature, as well as some of the examples which the participants gave to indicate how preschools can facilitate executive function through structured play. Through this, I hope to strengthen the development of executive function through play-based learning experiences.

Table 5.5: ELDAs principles (from the NCF) linked with executive function

EARLY LEARNING AND DEVELOPMENTAL AREAS	LEARNING OUTCOME	BEHAVIOURAL CHANGE	EXECUTIVE FUNCTION SKILLS
<b>1. Well-being</b>	<ul style="list-style-type: none"> <li>Children are becoming more aware of themselves as individuals, developing a positive self-image and learning how to manage their behaviour</li> <li>Children are demonstrating growing awareness of diversity and the need to respect and care for others</li> <li>Children are beginning to demonstrate physical and motor abilities and an understanding of a healthy lifestyle</li> </ul>	<ul style="list-style-type: none"> <li>play safely</li> <li>develop small muscles strength and coordination</li> </ul>	<ul style="list-style-type: none"> <li>Attention</li> <li>Self-regulation</li> <li>Working memory</li> <li>Cognitive flexibility</li> <li>Organise and plan</li> <li>Metacognition</li> <li>Task initiation</li> </ul>
<b>2. Identity and belonging</b>	<ul style="list-style-type: none"> <li>Children are becoming more aware of themselves as individuals, developing a positive self-image and learning how to manage their behaviour</li> <li>Children are demonstrating growing awareness of diversity and the need to respect and care for others</li> </ul>	<ul style="list-style-type: none"> <li>Awareness of themselves as capable and confident preschool learners</li> <li>develop a strong sense of self-care</li> <li>build strong relationships with other children and with adults</li> </ul>	<ul style="list-style-type: none"> <li>Attention</li> <li>Self-regulation</li> <li>Working memory</li> <li>Cognitive flexibility</li> <li>Metacognition</li> </ul>
<b>3. Communication</b>	<ul style="list-style-type: none"> <li>Children are learning how to think critically, solve problems and form concepts</li> <li>Children are learning to communicate effectively and use language confidently</li> <li>Children are learning about mathematical concepts</li> </ul>	<ul style="list-style-type: none"> <li>speaking and listening</li> <li>reading (for example, labels on containers, objects)</li> <li>recording and writing (drawings and paintings, modelling with clay)</li> </ul>	<ul style="list-style-type: none"> <li>Attention</li> <li>Self-regulation</li> <li>Working memory</li> <li>Cognitive flexibility</li> <li>Organise and plan</li> <li>Metacognition</li> </ul>

EARLY LEARNING AND DEVELOPMENTAL AREAS	LEARNING OUTCOME	BEHAVIOURAL CHANGE	EXECUTIVE FUNCTION SKILLS
		<ul style="list-style-type: none"> <li>• and mud, songs and rhymes about the experiences of playing with</li> <li>• sand and water</li> <li>• structure and vocabulary of a language</li> </ul>	
<b>4. Exploring mathematics</b>	<ul style="list-style-type: none"> <li>• Children are learning how to think critically, solve problems and form concepts</li> <li>• Children are learning to communicate effectively and use language confidently</li> <li>• Children are learning about mathematical concepts</li> </ul>	<ul style="list-style-type: none"> <li>• number and counting</li> <li>• sorting and classifying, making comparisons and solving problems</li> <li>• shape, space and measurement</li> </ul>	<ul style="list-style-type: none"> <li>• Attention</li> <li>• Self-regulation</li> <li>• Working memory</li> <li>• Cognitive flexibility</li> <li>• Organise and plan</li> <li>• Metacognition</li> </ul>
<b>5. Creativity</b>	<ul style="list-style-type: none"> <li>• Children are learning how to think critically, solve problems and form concepts</li> <li>• Children are becoming more aware of themselves as individuals, developing a positive self-image and learning how to manage their behaviour</li> <li>• Children are learning to communicate effectively and use language confidently</li> </ul>	<ul style="list-style-type: none"> <li>• solve problems of design</li> <li>• make pictures in 2D and 3D</li> <li>• play make-believe games</li> <li>• sing songs and rhymes</li> <li>• dance</li> </ul>	<ul style="list-style-type: none"> <li>• Attention</li> <li>• Self-regulation</li> <li>• Working memory</li> <li>• Cognitive flexibility</li> <li>• Organise and plan</li> <li>• Metacognition</li> </ul>
<b>6. Knowledge and understanding of the world</b>	<ul style="list-style-type: none"> <li>• Children are learning how to think critically, solve problems and form concepts</li> <li>• Children are demonstrating growing awareness of diversity and the need to respect and care for others</li> <li>• Children are learning about (mathematical) concepts</li> </ul>	<ul style="list-style-type: none"> <li>• designing, making items and exploring technology</li> <li>• exploring time and place</li> <li>• exploring and investigating the world</li> </ul>	<ul style="list-style-type: none"> <li>• Attention</li> <li>• Self-regulation</li> <li>• Working memory</li> <li>• Cognitive flexibility</li> <li>• Organise and plan</li> <li>• Metacognition</li> </ul>

(Department of Basic Education, 2015:2;4;13)



Table 5.6: Executive function and structured play games

EXECUTIVE FUNCTION	GAME TOYS	LISTING/ASSORTING	INSTRUCTION GAMES	MEMORY/IMITATION	SPEED/RACING	MOVEMENT EXERCISE
<b>Self-regulation</b>	Jenga Bowling Towers & pyramid Cars and traffic Paper plate ring toss Building blocks	Place cards/pictures in order Assort from smallest to biggest Building blocks/tower Three toti (indigenous)	Freeze Hopscotch Follow the leader What time is it Mr Fox? Ampe (indigenous) Stockings (indigenous)	Simon says Place cards/pictures in order Roleplay Heads and shoulders song If you're happy and you know it	Freeze Musical chairs Building blocks/tower Duck-duck goose Red light/green light Hot potato Catch and toss the ball	Obstacle course Limbo Dance routine
<b>Working memory</b>	Cards Puzzles	Matching pictures Sequencing steps Follow the recipe Shopping list	Orders at the restaurant What's in the bag?	Matching pictures Matching colours Shopping list Roleplay	Matching pictures Collect all items	Obstacle course Dance routine
<b>Cognitive flexibility</b>	Playdough Money notes Puzzles Building blocks LEGO® Plastic cones	Sequence the steps backwards Skip counting Hopscotch Diketo (indigenous)	Hide and seek Tag/touches Cashier and money Duck-duck goose Dominos Kudoda (indigenous)	Find the missing object Act out the opposite Simon says	Catch and toss the ball Tag/touches Dibeke (indigenous)	Obstacle course Limbo
<b>Attention</b>	Jenga Video games Puzzles Cards	Matching veggies & fruits Collecting items Assorting alphabet cards Matching shapes/colour	Guess who/acting it out I spy with my little eye Find the missing object	Father Abraham rhyme Spot the difference Card shuffling – identify the right one Heads and shoulders song Follow the recipe	I spy with my little eye Duck-duck goose Catch and toss the ball	Obstacle course Dance routine

			Follow the leader Spot the picture			
<b>Time management</b>	Towers/pyramid Maze	Assort the cards in order Sequence the steps Stacking blocks/towers	Hide and seek Find the missing/hidden treasure Mazes	Guess who/acting it out Assort the cards Sequence the steps (time regulation in all activities)	Freeze Cars and traffic Musical chairs	Obstacle course
<b>Prioritise</b>	Jenga Colour blocks Pool game Snakes and ladder	Matching shapes/colour Assorting alphabet cards Three toti (indigenous)	Hopscotch Snakes and ladder Kudoda (indigenous) Diketo (indigenous)	Dressing the doll Follow the recipe	Assorting alphabet cards Assorting numbers Assort according to sizes	Obstacle course
<b>Task initiation</b>	Jenga Rolling the dice LEGO®	Matching pictures/cards	Snap (card version) Follow the leader I spy with my little eye	If you're happy and you know it Simon says I spy with my little eye	Tag/touches What time is it Mr Fox? Kho-Kho (indigenous)	Obstacle course

Table 5.7: More ideas of structured play to enhance executive function in preschool

**ACTIVITIES AND RESOURCES AVAILABLE ON THE WORD WIDE WEB THAT ENHANCE EXECUTIVE FUNCTION**

The collage features the following activities and their associated skills:

- Activity 1:** A wooden tray with compartments containing different colored objects (e.g., buttons, beads). **Skills:** Working memory, Attention.
- Activity 2:** A long wooden strip with a red arrow and a sequence of colored dots. **Skills:** Cognitive flexibility, Self-regulation.
- Activity 3:** A child playing with a board game featuring letters and numbers. **Skills:** Self-regulation, Organising.
- Activity 4:** A child standing in a line of colorful balloons. **Skills:** Planning, Prioritise, Self-regulation.
- Activity 5:** A table with numbered plates (1-20) and small objects. **Skills:** Organising.
- Activity 6:** Two children playing with a large, colorful geometric shape made of blocks. **Skills:** Task initiation, Self-regulation.
- Activity 7:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 8:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 9:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 10:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 11:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 12:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 13:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 14:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.
- Activity 15:** A child playing with a large number '2' on a red floor mat. **Skills:** Task initiation, Self-regulation.

(Monette, Bigras & Lafreniere, 2015; Yogman et al., 2018).



**Attention**  
**Organising**

**Working memory**  
**Attention**

**Organising**

**Self-regulation**  
**Attention**

**Organising**

**Planning**  
**Prioritise**

**Cognitive flexibility**

(Johnson, Christie & Wardle, 2005; Petty & Coelho de Souza, 2012).

The collage features several educational activities:

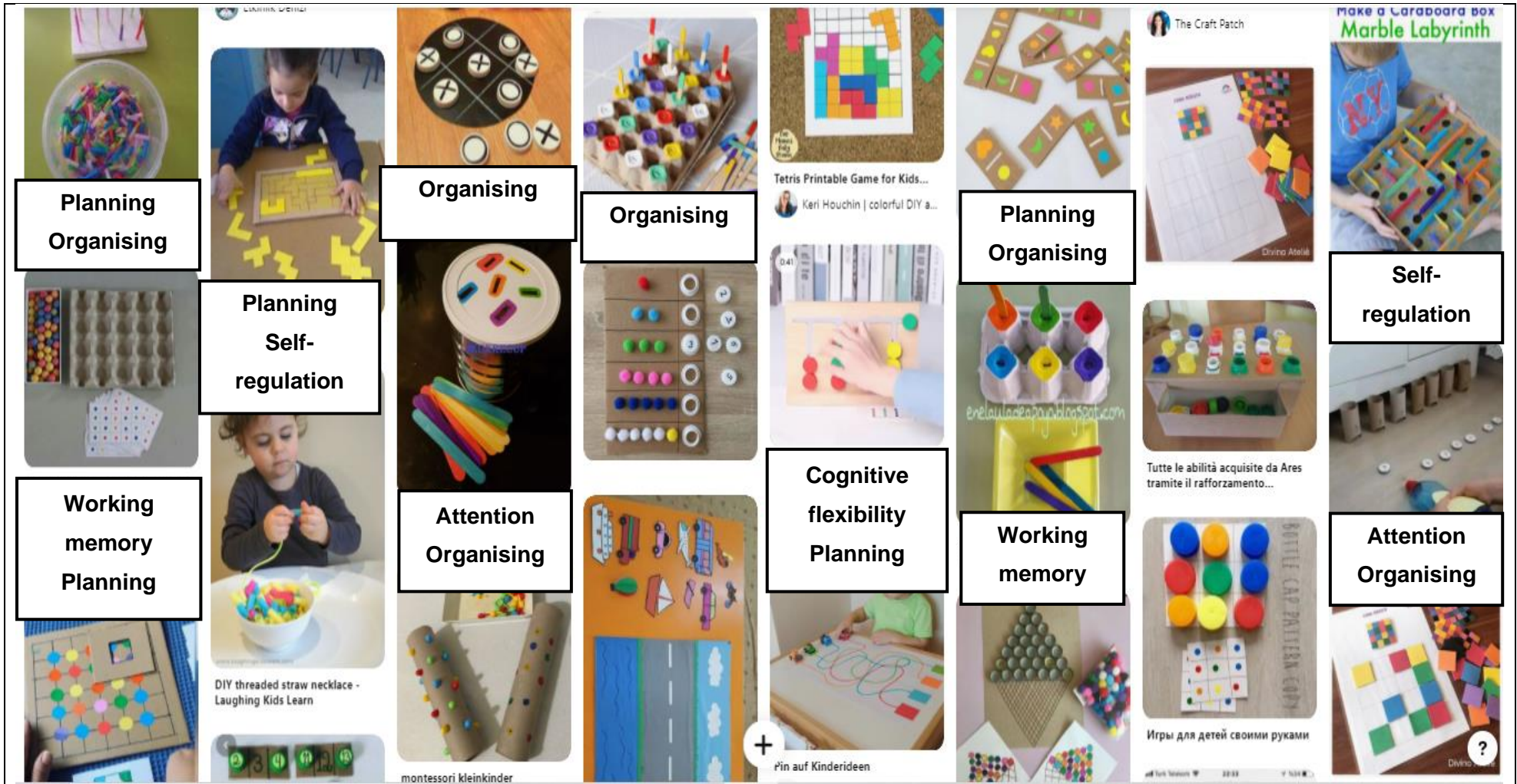
- Preschool Activities for Back... Planning Playtime**: Shows dot-marker patterns on a grid for cognitive and organizational skills.
- Kindergarten Literacy Centers**: Shows children using a literacy center with a My Teaching Pal character for self-regulation and planning.
- Easy Peasy and Fun**: Shows a paper doll activity for task initiation and organizational skills.
- Button Sorting Cups**: Shows children sorting buttons into colored cups for organizational skills.
- Tic-tac-toe**: Shows a tic-tac-toe game with buttons for cognitive flexibility.
- TETRIS printable game**: Shows a Tetris printable game for cognitive flexibility.
- Make a Cardboard Box Marble Labyrinth**: Shows a marble labyrinth activity for cognitive flexibility.
- Key Cutting**: Shows children cutting out key shapes for attention and organizational skills.
- Dot Marker Patterns**: Shows children using dot markers for attention and organizational skills.
- String and Button Activity**: Shows a string and button activity for self-regulation and planning.

Each activity is associated with a specific skill or cognitive function, as indicated by the text boxes overlaid on the images:

- Organising Cognitive**
- Self-regulation Planning**
- Task initiation Organising**
- Self-regulation**
- Organising**
- Attention Organising**
- Cognitive flexibility**

(Brown, 2008; Thibodeau et al., 2016).





(Macdonalds et al., 2016; Monette, Bigras & Lafreniere, 2015).





### **5.3 CONCLUSION**

In this chapter, I gathered the findings of the study into tables that supports and opposes the existing literature. Moreover, the analysis reports the silences in literature, such as the lack of play-based learning opportunities that enhance executive function, as well as provide emerging insights on the topic. The chapter revealed how literature sometimes does not adequately discuss the types of resources or challenges which teachers experience when facilitating executive function through structured play. Lastly, there is the need for preschool teachers to know how to link executive function according to the NCF, as this will ensure purposeful training of executive function during preschool years. Consequently, the guideline created in the study supports the training and development of executive function through structured play. Chapter 6 details the reflection of the chapters, conclusions of the research questions, the limitations and recommendations of the study.

## **CHAPTER 6: REFLECTIONS, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS**

### **6.1 INTRODUCTION**

According to Edith Wharton, “there are two ways of spreading light: to be the candle or the mirror that reflects it”. In this journey of exploring the role of structured play in facilitating preschool learners’ executive function, I hope to have spread some light on the teaching techniques that can be used to enhance executive function through structured play or at least, mirror the knowledge provided by preschool teachers. Chapter five outlined the supporting evidence, contradictions, silences and emerging knowledge against literature (see Tables 5.1; 5.2; 5.3; 5.4). In this final chapter, reflections on the study, as reported in the previous chapters, are discussed followed by a discussion of how the research served to answer the research questions. The chapter proceeds to discuss the limitations of the study and make recommendations for future studies. The chapter ends with a conclusion of the entire study.

### **6.2 REFLECTION OF PREVIOUS CHAPTERS**

Chapter 1 provided the background as well as the rationale of the study. This was followed by a presentation of the primary and secondary research questions (see section 1.3). The chapter clarified the concepts used in the study and discussed interchangeable terms. The mandate for playful learning and modern challenges around play were discussed and was followed by a presentation of the theoretical frameworks and a brief outline of the research methodologies used (see section 1.5 and 1.6). Chapter 1 ended with a description of the ethical considerations and an outline of the chapters of this research report. Scrutiny of the rationale for the research provided a better understanding of the problem statement as well as a mandate for playful learning. Working differently, I could have outlined the aims and objectives of the study in that chapter, this would have assisted me to determine if the study achieved these outcomes in the end. Furthermore,

the inclusion and exclusion criteria that I presented could have specified years of experience to narrow down participants.

Chapter 2 focused on presenting a selection of the literature on the topic in order to get an in-depth understanding of executive function. This included discussing various components of executive function: its development, importance, and how executive function permits learning (see sections 2.3 and 2.4). The chapter also summarised early childhood programs (locally and internationally) and outlined the South African preschool education standard framework (see section 2.5). The literature review discussed the importance of play in early childhood education and how structured play can assist the development executive function. The chapter ended with detailing the theoretical framework of Vygotsky's sociocultural theory, as well as the metacognitive theory (see sections 2.8.1 and 2.8.2). The purpose of this was to show how executive function can be facilitated and developed in preschool learners. In retrospect, given that executive function is such a broad topic, I could have provided knowledge on the different kinds of play that enhance executive function. Secondly, the theoretical frameworks could have spoken to how it enhances executive function skills; this would have provided insight into the application of the theories.

Chapter 3 presented the research process of the study; this consisted of the research methodology, methodological considerations, trustworthiness and ethical consideration. The study made use of a qualitative research approach, which also applied a multiple case study approach as a research design (see section 3.3). Eight participants from four preschools were included; and the chapter shows that the teachers taught at preschools that followed the NCF, ISASA, Montessori and Reggio Emilia approach. Data gathering techniques consisted of semi-structured interviews, observations, documents, photographs and field notes; whereas the section on trustworthiness outlined credibility, transferability, dependability and confirmability (see section 3.4; 3.5; 3.6). The chapter concluded with an explanation of how ethical considerations were adhered to; this consisted of outlining how informed consent, anonymity and confidentiality had been upheld. Looking back on the data generating techniques, the study could have included some field notes completed by teachers in which they could have shared/provided their

accounts. Secondly, the observations could have been done more than once and other documents, besides the lesson plans could have been included; these could have included timetable and weekly planners. I also could have followed up on the participants' outlook on the topic (post interviews) after their having learned about executive function to see if they purposefully exercised the skill better.

Chapter 4 clarified the findings of the empirical data. It tells how the participants and their responses were coded to simplify and identify unique answers (see section 4.3). I went on to examine all the empirical data retrieved (see Appendix M). The data analysis consisted of inspecting interviews, observations and learning experience plan documents; this was done to gain an understanding of how preschool teachers facilitate executive function through structured play (see section 1.3). The chapter ended off by discussing the interpretation of themes as well as sub-themes that emerged from the findings (see section 4.5.1). The most significant lesson learnt from the participants' responses is that S3 and S4 facilitated preschool learners to be more independent by providing child-centred activities. Secondly, it became clear from my research that the term 'executive function' is not generally known by preschool teachers, although the skills get developed in daily learning activities (see section 4.4.1.2). Teachers' roles during tasks play a vital part in instilling executive function through structured play - something which I found was not often emphasized in literature on the topic (Diamond & Lee, 2011; Duval et al., 2016; Rothlisberger et al., 2012). Lastly, it seems that the curriculum outcomes are not all that well aligned with executive function, this can make it challenging for educators to develop the skill according to policy (see section 2.5.2).

Chapter 5 compared some of the existing literature with findings from the study. This was done to present the supporting evidence, contradictions, silences and new insights from the study (see Tables 5.1; 5.2; 5.3; 5.4). The chapter also provided a guideline to demonstrate how executive function can be linked with the NCF to provide ideas to enhance the skill through structured play games (see Tables 5.5 and 5.6). The chapter ended with an overview of the empirical research findings. The chapter revealed what has been done, what can be improved and further knowledge that is needed on the topic (see Table 5.4). In doing the research I became aware of the contradictions and

similarities between the participating schools, even though they follow different curriculums/learning approaches (see Table 5.2). The overview allowed room to present my contributions to the study, this was outlined in Tables 5.5, 5.6 and 5.7.

This final chapter of my research report discusses the conclusions, limitations and recommendations of the study. Hence, the next section proceeds to answer the research questions.

### **6.3 ANSWERING THE RESEARCH QUESTIONS**

In this section, I will discuss the research in terms of how it addressed the research questions by first presenting a discussion of the secondary, and then, of the primary research question of the study.

#### **6.3.1 Secondary question 1: Which teaching techniques do teachers utilise when facilitating executive function through structured play?**

The literature points out that executive function can be taught in various ways – this includes parental guidance, completing house chores and playing games (Harvard University, 2015; Levine & Munsch, 2016; Schoemaker et al., 2012). Thus, literature helped answer this question by providing examples of daily activities that can be practised inside and outside the learning environment (Center on the Developing Child at Harvard University, 2016; Harvard University, 2015).

From the responses obtained from the teachers, teaching techniques that support executive function through structured play include firstly, the teachers guiding preschool learners; this consisted of preschool learners performing tasks correctly so they can attain the learning objectives (see section 4.4.2.2). Secondly, teachers can model what preschool learners are expected to do during a learning experience. This includes demonstrating how the task ought to be done. Given that preschool learners are particularly orientated to taking in visual cues, they then imitate the actions they see; hence, one of the most powerful forms of teaching preschool learners is by showing them what to do. Apart from modelling actions, preschool teachers always need to provide instructions before commencing a task (see section 2.7.2.3). This is done to guide

preschool learners' actions so that they can perform the task correctly. T3 explained the forms of instructing preschool learners; this consisted of providing easy-to-follow steps so that the children could remember the sequence of the task. Teachers reported that they had to repeat the knowledge shared during the learning experience; the purpose of this was to recap information and gradually develop preschool learners' working memory (see section 4.4.1.2). Although teachers are required to remind preschool learners of relevant details, preschool learners need to be attentive and listen when the teacher is speaking. Since literature notes that attention and self-regulation facilitate working memory, preschool learners need to direct their thoughts and actions towards obtaining knowledge from the learning experience (Doebel, 2020; Dias & Seabra, 2015; Ganesan & Steinbeis, 2021).

Lastly, the learning activities should be child-led; teachers can use this technique to ensure preschool learners are at the forefront of completing the task themselves. For example, when completing puzzles or collecting natural objects outside, preschool learners had to complete tasks themselves rather than have the teacher complete actions on behalf of the child. Teachers should also implement games that children love and are interested in (see section 4.4.2.2). Activities that are child-led and that speak to learners' interests, enabled preschool learners to be involved during tasks, to explore and have fun, which develops various skills, including executive function, during learning experiences (see section 2.7.2.5).

### **6.3.2 Secondary question 2: What are teachers' roles when facilitating executive function through structured play?**

Based on the findings from literature, teachers' roles when facilitating executive function through structured play include arranging, directing, and providing instructions; this is often the result of teachers being at the forefront of guiding play activities (see section 2.7.2.3). Thus, teachers were required to watch over preschool learners, their actions and progress during tasks, this was to ensure that learning objectives were met and that the children employed a high level of cognition (see section 4.4.1; 4.4.2).

From the findings of this study, one of their roles in facilitating executive function through structured play consists of teachers supervising preschool learners to attain the learning

outcome (see section 4.4.1.2; 4.5.1.1). The participants explained that, by supervising the children's activities, teachers are required to observe what preschool learners are doing and follow up on the progress/challenges preschool learners experience. Apart from supervising, teachers motivated and taught preschool learners to persevere when they lost interest in the task (see section 4.4.1.2; 4.5.1.1). Secondly, teachers appreciated children's efforts by rewarding or praising them after completing a task. T4 said that when children got positive feedback, it encouraged them to keep learning and even to explore other, new areas of learning (see section 4.4.1.2; 4.5.1.1). Teachers also alternated various kinds of activities to stimulate mental abilities and develop cognitive flexibility. For this, the participants had to present a task in different ways so that preschool learners could become accustomed to thinking and working in a variety of ways (see section 4.4.2.2). Ultimately, the teachers applied alternating activities by varying the order of tasks and presenting more challenging levels of learning at different play stations. The fourth aspect consisted of teachers probing preschool learners (see section 4.5.1.1). This helped teachers to understand what the children were thinking and for the children to communicate their thoughts/actions out loud – this is known as metacognitive skills (thinking about one's thought process). Metacognition is essential for learning, as it allows children to reflect on what they are doing and to consider alternative strategies to reach a learning outcome (see section 2.8.2).

When struggling to complete the task, teachers should provide them with the necessary support (see section 2.8.1.2). Assisting those who struggle can be done directly or indirectly; for example, teachers providing the necessary learning materials, removing objects out of the way or reminding children of a step that they might have missed (see section 2.7.1.4). Lastly, teachers need to assess preschool learners during structured play activities to monitor their progress and evaluate their learning development (see section 4.5.1.2). Subsequently, the role of the teacher is not only limited to watching preschool learners; they also need to support them during play.



### **6.3.3 Secondary question 3: What resources are utilised to facilitate executive function through structured play?**

The resources utilised to facilitate executive function through structured play included items such as musical instruments, LEGO®, pegs, shapes and picture cards – both store-bought and handmade learning resources were encountered (see Figure 4.6). Thus, teachers were required to present the item that would be utilised in the learning experience and allow preschool learners to explore its features (see section 4.5.1.3). T5 explained how presenting the material helped preschool learners develop thought around the item and communicate their ideas; this strengthens their communication skills (see section 4.4.1.2). In presenting the learning materials, teachers could discuss how the item looked (unique traits), show what the item is used for, and discuss how the item would support the objective of the learning experience. Learning activities that utilise resources during play develop various skills such as fine and gross motor skills; these resources should be hands-on, allowing preschool learners to feel and engage with the object (see Figure 4.9). When using resources during tasks, preschool learners get to conceptualise ideas and use the items in different ways promoting cognitive development as well as flexibility (see section 4.5.1.3). The items must be child-centred and be age-appropriate so that preschool learners can engage with them without any constraints, and resources should allow more than one player to participate in the game (see section 2.7.1.4; 4.5.1.3). Preschool learners were often paired during structured play games; this allowed them to interact and assist one another.

Although the national curriculum provides games to implement for preschool learning, it does not make any suggestions as to the types of open-ended materials or closed-ended materials that would enhance various skills (see section 2.7.1.4). Hence, the common items that facilitate executive function through structured play consist of natural objects, closed-ended materials/toys and open-ended materials/toys (see section 4.5.1.3). Natural objects are items such as sticks, rocks and cork that can be used for counting. Secondly, teachers can also use closed-ended toys. Closed-ended toys, such as puzzles, are items that have a single purpose. Puzzles only have one purpose – that is to assemble different pieces in forming an overall picture. Puzzles, in relations to executive function, help train preschool learners' attention and cognitive flexibility. Another closed-ended toy

that teachers can use are memory cards to strengthen attention skills and working memory (see section 4.5.1.3).

Lastly, in relations to open-ended materials, some of the resources that can be used are playdough, shapes, building blocks, and a sports ball (see section 4.5.1.3). Open-ended materials are valuable resources as they have various possible functions and preschool learners can use them in different ways. Consequently, preschool teachers can use any kind of play materials (see section 4.4.1.2; 4.4.2.2). The resources, however, need to enhance executive function skills such as working memory, cognitive flexibility and self-regulation through structured play (see section 2.7.2.5). The more opportunities children have to work with various items, the better they will be able to practice and attain executive function; therefore, teachers should strive to be versatile when using learning materials during structured play (see Figure 4.9).

#### **6.3.4 Secondary question 4: What challenges and benefits do preschool teachers experience when facilitating executive function through structured play?**

The challenges which preschool teachers experience when facilitating executive function through structured play include the children remembering, cooperating, regulating emotions, initiating tasks, persisting, and the use of technology (see section 4.5.1.4; Table 4.2). This is often the result of undeveloped executive function and inept planning of structured play activities. Preschool learners often struggled to self-regulate – for example, to listen to instructions or sit still (see section 2.7.2.4; 4.5.1.4). Furthermore, preschool children sometimes resisted cooperating during games; thus, teachers were required to intervene and calm down disagreements (see section 4.4.2.4). T7 explained how the struggle to initiate games delayed the learning activity. Teachers often had to initiate the task for preschool learners until they got motivated to participate (see section 4.4.1.2). Preschool learners who struggled to behave accordingly battled to learn and work well with others, limiting their academic success. The effects of this resulted in a lack of cooperation, emotional tantrums, as well as the inability to follow instructions (see section 4.4.2.4).

Apart from the issue around preschool learners not initiating play activities, the children also found it hard to persist, especially when they could not figure the next step or the level of the game became more challenging (see section 4.5.1.4). Teachers emphasised the importance of completing tasks/games so that preschool learners would not easily give up; this forms part of developing the executive function skill of persisting (see section 4.4.1.2). Structured play games taught preschool learners the concept of commencing a task with the aim to complete it (see section 2.7.2.5).

The last challenge which was identified, has to do with the impact which teachers felt technology had on preschool learners' learning. T4 found that due to young preschool learners often engaging in computerised games on technological devices, the children were sometimes reluctant to engage in classroom games - they struggled to be physically active, struggled to work with various play-based materials and lack social skills (see Table 4.2). The teachers thought that schools need to allow more play-based learning to address the challenges which preschool learners experience during play (see section 4.4.1.2).

The benefits of facilitating executive function through structured play include having greater autonomy, peer assistance, confidence, communication and concentration skills, as well as managing classes (see section 4.4.2.4). Teachers explained that the benefits were often the result of implementing play-based learning; it enables greater learning and overall development of the child (see section 4.4.1.2). Preschool learners become open to attain the learning objectives on their own. T3 expressed that preschool learners often assisted one another during play. Hence, preschool learners shared techniques, as well as supported one another, to achieve the learning objective. By employing structured play activities, preschool learners completed most of the activities independently (4.4.2.4). Hence, evidence from the finding reveals that preschool learners relied less on educators particular during structured play (see section 4.4.2.4). Preschool learners in S3 and S4 acted autonomously in those activities they were interested in. Although teachers were at the forefront of managing classrooms, structured play activities helped children to regulate their behaviour whilst learning. In other words, structured play facilitates classroom management (see section 2.7.2.5).

### 6.3.5 Main research question: How can preschool teachers facilitate executive function through structured play?

Preschool teachers can facilitate executive function by applying fun games, songs, movement exercises or racing competitions in structured play activities. Since the activities require following rules, remembering instructions and working accordingly; executive function skills such as self-regulation, working memory and cognitive flexibility become enhanced using structured play. The participants explained that indoor, outdoor, as well as learning experiences enabled games, songs and movement exercises to develop executive function (see section 4.4.1.2).



*Figure 6.1: Facilitating executive function through structured play*

The indoor activities consisted of games/activities that occur within the classroom; these included building puzzles, playing with memory cards or assembling different toy parts (see section 4.4.2.2; 4.4.2.4). The outdoor activities involved preschool learners partaking in dance routines, completing obstacle courses or playing hopscotch. With regard to learning experiences, these tasks are centred on enhancing academic skills; the structured games, for example, support the learning of shapes, develop numeracy skills, or learn the alphabet using memory cards and singing songs (see section 4.4.2.2; 4.4.2.4). Consequently, teachers are encouraged to practice executive function skills in different settings.

The participants also discussed sub-components of indoor, outdoor and learning experiences that facilitate executive function through structured play. The first aspect is that it is important for the teacher to be aware of preschool learners' interests when implementing structured play games, as this promotes engagement and attention during tasks (see section 4.4.1.2). Secondly, teachers can incorporate child-led activities that will have preschool learners taking control of the task and reduce their dependency on the teacher (see section 4.5.1.1). The third factor that supports executive function through structured play consists of pairing preschool learners. Collaboration is a learning experience that allows children to learn from each other and develop social skills, which relates to Vygotsky's sociocultural theory that supports the acquisition of knowledge and skills from social interactions (see section 2.8.1). Preschool teachers can also use different learning materials to support structured play games, including closed-ended toys or open-ended materials (see section 4.5.1.3). The final aspect has to do with the teacher's role during structured play games; this is because the value of adult guidance ensures preschool learners attain the necessary executive function skill. Teachers guide, probe, model and evaluate preschool learners' executive function according to the learning experience outcomes (see section 4.5.1.2).

Teachers should use learning experience lesson plans to organize learning activities. This is because the lesson document structures the outcomes and aims of supporting the development of executive function skills (see section 4.4.3). In the course of planning learning experiences, teachers need to be creative and innovative with the games; hence, the structured play games need to be different from one another as this will stimulate children's cognitive skills during tasks (see section 4.4.3). Subsequently, when facilitating executive function through structured play, teachers need to be skilled in developing executive function. For example, they need to know how to evaluate classroom practices, resources and learning spaces; and to link executive function according to the National Curriculum Framework. This will ensure that educators purposefully develop executive function according to the national learning outcomes (see Table 5.5). While this study contributes to the understanding of executive function through structured play, it does have some limitations; these are noted in the following section.

## 6.4 LIMITATIONS

The sample size consisted of visiting only one school per curriculum approach - an NCF, Montessori, Reggio Emilia and ISASA preschool (see section 3.4.1). Although there was a total of eight participants, I would have liked to have visited more schools to further observe the various approaches and how teachers from each develop executive function through structured play. The COVID-19 pandemic made it very challenging to obtain permission to enter schools (the result of the requirement for having little to no contact with preschool learners and teachers) which limited the number of schools in the study. It would have been interesting to note whether preschools who adopt and implement the same curriculum also teach executive function through structured play the same way. In other words, how consistent different participants are when teaching the same phenomenon. This is something which was not designed for this study to measure.

The second limitation was that I only obtained permission to observe the participants and their preschool learners for one day (see section 3.7). The study would have benefitted from a longer observation period, which would have allowed me to have observed learning experiences on different days to see how often structured play activities were implemented (see section 3.4.2). It would also have allowed me to determine whether the teachers applied the same technique more than once, and if their roles during structured play changed over time. The results would have given information as to whether facilitating executive function through structured play is consistent each day or whether there are periods where structured play is not engaged in at all.

Lastly, the study was conducted within affluent areas of Pretoria within the Gauteng province. The study would have yielded rich data if I had been able to observe and compare schools that taught the same curriculum in less affluent locations as compared to those in more affluent environments (see section 3.4.1). Such observations would have enabled me to note the differences in implementation in schools outside the city; for example, the challenges experienced, whether or not teachers facilitated executive function through structured play the same way, and if the learning materials are as versatile in poorer schools. Hence, I acknowledge and attempted to regulate the bias in the selection of schools by applying the quality criteria noted in section 3.6.

## **6.5 RECOMMENDATIONS**

According to the findings of the study, I would like to make the following recommendations for policymakers, preschools, preschool teachers and further research.

### **6.5.1 Recommendations for policymakers**

Since preschool teachers struggled to link executive function according to the curriculum/ learning approach the school followed, early education policies ought to find more forms of implementing executive function in preschool learning activities (see Table 5.6). The policies should include activities that promote self-regulation, cognitive flexibility and working memory through structured play. South Africa's preschool curriculum currently does not link any of its learning outcomes with executive function nor does it highlight the importance of developing the skill (see section 1.2.1). Hence, the NCF needs to make executive function a prerequisite for learning and schooling preparation. Such changes to the policy will significantly enhance teachers ability to develop preschool learners' cognitive and social skills in the early years (see Table 5.5).

Secondly, the curriculum ought to provide guidelines/suggestions for structured activities that support children's acquisition and development of executive function (see Table 5.6). The fact that literature is limited in terms of providing ideas, teaching techniques and describing teachers' roles during play, learning policies ought to make suggestions as to how this can be attained within preschool learning experiences (see section 2.7.1). The guidelines should state how learning experiences can be designed, what teachers can do during play, the duration of the activity, how often games should occur, the various roles of teachers and children, and discuss the teaching techniques that would best support preschool learners during play (see sections 4.5.1.1; 4.5.1.2; 4.5.1.3; 4.5.1.4)

### **6.5.2 Recommendations for preschools**

Literature advises teachers to spend less time on drilling academic content and rather opt for learning opportunities that permit preschool learners to interact with the learning environment, as well as with their peers (Aronstam & Braund, 2015; Haney & Bissonnette, 2011; Yeboah, 2015). Since play has been noted to be one of the most effective ways for preschool learners to learn, preschools ought to instil techniques that encourage play-



based learning (see section 2.7.1). Literature suggests the following techniques (Axelsson et al., 2016; Fleer et al., 2017; O'Neill et al., 2012; Russell, 2015; Xiong et al., 2017; Zyga, 2016):

- Employ structured play games that promote specific strengths such as problem-solving skills.
- Apply Learning Teaching Support Material for learning experiences. These materials should be of children's interests, allow engagement with the objects, as well as provide children with a frame of reference for their learning (also known as pre-knowledge of a topic).
- Practice structured play games that develop self-regulation. For example, activities that encourage preschool learners to wait their turn, regulate their actions and follow specific instructions to attain the learning outcome.
- Utilise structured play games that have complex rules to help enhance executive function. This can be attained using different play stations that consist of various tasks; the tasks will improve preschool learners' cognitive, as well as social skills.
- Apply individualised toys that enable children to explore how to use the item and work flexibly with it. This will permit preschool learners to learn, as well as retain, information when working with diverse materials.

Schools should evaluate the classroom practices, materials and learning spaces in terms of supporting the development of executive function; and align learning experiences to improve executive function (see Table, 5.7). Interestingly, none of the preschool teachers mentioned attending any training programmes, or continuous professional teacher development (CPTD) that had the teaching of executive function as part of the course content. To remedy this, preschools should support teachers to attend training programmes in support of developing executive function through play-based pedagogy. The training programs should focus on teacher preparation, as well as continuous capacity building and professionalisation of teachers to enhance their skills in developing executive function. In attending training programmes, schools can ultimately develop a

guide that details unique resources and games that develop executive function in a learning experience (see Tables 5.5 and Table 5.6). This will not only assist children but also help the teacher to better understand and practice executive function.

### **6.5.3 Recommendations for teachers**

Given that teachers were not all that familiar with the term “executive function”, I had to briefly explain the term to participants and provide examples before asking the interview questions. Hence, the study recommends that teachers learn more about executive function and how the skill is necessary for learning; as well as how executive function can assist preschool learners with daily operations. The knowledge and skills about executive function, as well as guidelines and tips should be gained during teacher training programmes.

Teachers ought to use various resources during structured play to enhance executive function skills (see section 4.5.1.3). This includes using items such as natural objects, closed-ended toys as well as open-ended materials. The more exposure preschool learners have to work with different kinds of toys, the better the chance of improving their cognitive flexibility. The ability to alternate tasks consists of integrating various play stations since the stations have different activities (see section 2.7.2.5). In this way, children would be exposed to working with different learning materials. When preschool learners adjust/change their thinking/working patterns, it strengthens their executive function, as executive function combines lower mental abilities with higher cognitive functioning. Overall, learners’ thinking and behavioural skills would improve thanks to better executive function.

Suggestions for alternating tasks in learning experiences:

- Learning instructions could be different in each play station.
- All learning stations ought to have different learning materials.
- Learning activities in stations ought to have different learning objectives.
- Preschool learners should be allocated to different stations thus avoiding the same group often working together.

#### **6.5.4 Recommendations for future research**

Literature lacks adequate knowledge around enhancing executive function through play in the early years, especially in South Africa (see section 2.5.2). Although much has been written on the topic of play as methodology, there is very little in-depth knowledge on how play facilitates executive function during the early years (see section 2.4). If literature were to enhance knowledge of executive function through structured play, this would enable greater awareness to purposefully exercise this skill in the daily curriculum. Children would be more equipped and readied to commence formal schooling, as well as adopt independent learning in classrooms. Hence, future studies could explore how executive function through play assist child development, as well as benefit teachers in the classrooms. Studies should explore how various forms of play enhance executive function, as well as instil its techniques within a preschool learning environment.

Secondly, the study only explored the facilitation of executive function in structured play in schools within more affluent areas (see section 3.4.1). Further research could explore how preschool teachers develop executive function in poorer and rural areas. This is to note the teaching techniques and resources that teachers in resource poor learning environments use to enhance executive function. Furthermore, research on the challenges experienced by teachers when implementing structured play for executive function, might make a valuable contribution to how the challenges can be overcome. Lastly, future studies could explore the kind of teacher preparation programmes and continuous professional teacher development courses that might strengthen teachers' awareness of the topic and, as a result, help improve executive function in preschool children. This would inform readers of existing programs, and how they support learning experiences to develop executive function.

#### **6.6 CONCLUDING REMARKS**

The chapter outlined the conclusion of the study by exploring the research questions and how they had been answered by this research (see section 6.3). By exploring the role of structured play in facilitating preschool learners' executive function, I discovered ways to enhance learning and the acquisition of executive function through structured play;

incorporate learning experiences that balance academic focus together with play; identify opportunities for preschool learners to participate in structured play that facilitates executive function; and create opportunities for learning through structured play that children experience as fun, engaging, hands-on and interesting.

What I found interesting were the different teaching techniques that teachers incorporated to train executive function; this included the teacher being directly, as well as indirectly, involved during structured play activities (see section 4.4.2). I was also surprised to find the vast number of resources used during structured play and the games were often child-led to enable independent learning (see section 4.4.2). On the other hand, the study found how difficult it was for teachers to align executive function with curriculum outcomes due to the NCF document not providing clear guidelines on how to link executive function with learning experiences (see section 4.4.3). To address this shortfall the study developed a guideline that integrated executive function skills with the ELDA's outcome, as well as structured play games (see Tables 5.5; 5.6; 5.7).

Supporting executive function through structured play requires thorough planning and understanding of executive function and structured play. Educators should make it a priority to implement structured play games where preschool learners can participate in indoor, outdoor and learning experiences to develop and practice executive function skills in preparation for formal learning. The challenges with regard to facilitating executive function through structured play need to be further explored in research so that more effective techniques to support teachers can be developed.

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## **APPENDIX A: INTERVIEW QUESTIONS**

*The purpose of the following interview questions is to explore how preschool teachers facilitate executive function through structured play: what they perceive executive function is; how they implement it in lessons through structured play, and the requirements needed to develop executive functions in learners.*

1. What do you think executive function means?
2. What do you think structured play means?
3. Do you think executive function and structured play are important for learning; if so why?
4. How do you plan for structured play and how often is it implemented?
5. How do you approach teaching executive functioning through structured play? (e.g. the techniques).
6. Which materials/resources do you use for structured play?
7. What do you as a teacher do when children are engaged in structured play activity?
8. What do you find challenging when teaching executive function through structured play?
9. What benefits do you experience when facilitating executive function through structured play?
10. Do you use children's preferences and interests when planning structured play or is it mostly themed/activity based?



**APPENDIX B:**  
**OBSERVATION GUIDELINE FOR TEACHERS**

1. Which of the executive constituents are evident taught during the lesson?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

2. What teaching method/ action does the teacher utilise to facilitate executive function in during play?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

3. What resources/games are used to develop executive function?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

4. How does the play activity support the facilitation of executive function?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

5. What challenges does the teacher face whilst facilitating executive function?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

6. How does the teacher facilitate executive function during the play activity?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

7. What is the teacher's role(s) during the play activity?

\_\_\_\_\_

*Remark:* \_\_\_\_\_

## APPENDIX C: OBSERVATION GUIDELINE FOR LEARNERS

Likert scale: **1 – none**    **2 – some/partial**    **3 – almost fully**    **4 – fully**

Checklist	Items	Likert scale				Comments
		1	2	3	4	
1. Do children easily follow the teacher's instruction during the activity?	Listening	1	2	3	4	
	Visual illustration	1	2	3	4	
	Transactional skill	1	2	3	4	
	Movement gestures	1	2	3	4	
2. What executive function skill do children struggle with the most?	Attention	1	2	3	4	
	Working memory	1	2	3	4	
	Time management	1	2	3	4	
	Self-regulation	1	2	3	4	
	Planning & prioritising	1	2	3	4	
	Task initiation	1	2	3	4	
	Cognitive flexibility	1	2	3	4	
	Organising	1	2	3	4	
3. What benefits do preschoolers experience when exercising executive function through structured play?	Better Attention	1	2	3	4	
	Better Working memory	1	2	3	4	
	Better Time management	1	2	3	4	
	Better Self-regulation	1	2	3	4	
	Better Planning & prioritising	1	2	3	4	
	Better Task initiation	1	2	3	4	
	Better Cognitive flexibility	1	2	3	4	
	Better Organising	1	2	3	4	
4. How do the children manage and organise the activity presented by the teacher?	Seating structure	1	2	3	4	
	Transition queues	1	2	3	4	
	Teacher-led	1	2	3	4	
	Self-regulated	1	2	3	4	
	Physical/imaginative resources	1	2	3	4	
5. Is there any evidence of indecisive behaviour by the child during the activity?	Looking around	1	2	3	4	
	Continuously asking for support					
	Continuously asking peers	1	2	3	4	
	Wanders before working	1	2	3	4	
	Learner is aloof	1	2	3	4	
	Anxious/panicking	1	2	3	4	
	Fiddling with resources	1	2	3	4	
		1	2	3	4	

6. What executive function skills are evident when children engage in structured play?	Games and problem solving	1	2	3	4
	Songs; music; dance	1	2	3	4
	Movement exercise	1	2	3	4
	Open/closed resources	1	2	3	4
	Routine; behaviour charts	1	2	3	4
	Art; fantasy	1	2	3	4
7. What are the emotional and physical responses of the child during structured play?	Excited	1	2	3	4
	Bored	1	2	3	4
	Confused	1	2	3	4
	Worried	1	2	3	4
	Anxious	1	2	3	4
	Angry	1	2	3	4
	Sits	1	2	3	4
	Stands	1	2	3	4
	Runs around	1	2	3	4
8. What executive function skills are evident when children engage in structured play?	Attention	1	2	3	4
	Working memory	1	2	3	4
	Time management	1	2	3	4
	Self-regulation	1	2	3	4
	Planning & prioritising	1	2	3	4
	Task initiation	1	2	3	4
	Cognitive flexibility	1	2	3	4
	Organising	1	2	3	4
9. What approaches were used to help children acquire executive function skills?	Modelling/explanation	1	2	3	4
	Discovering/inquiring/exploring	1	2	3	4
	Experimenting	1	2	3	4
	Prompts	1	2	3	4
	Child-led learning	1	2	3	4
	Self-regulation	1	2	3	4
	Sensory-led learning	1	2	3	4
	Group learning	1	2	3	4
Questioning/problem solving	1	2	3	4	
10. Any evident examples of structured play activities?	Game toys	1	2	3	4
	Games with academic content	1	2	3	4
	Movement exercises	1	2	3	4
	Games that require listing/assorting	1	2	3	4
	Instruction games	1	2	3	4
	Memory/imitation games	1	2	3	4
	Speed/racing games	1	2	3	4

## DIFFERENT TYPES OF ACTIVITIES (IN THE GRADE R- CLASS)

Language	Mathematics	Life Skills	Free play inside	Educational toys	Free play outside
<ul style="list-style-type: none"> <li>❑ Listening and speaking</li> <li>❑ Reading and phonics</li> <li>❑ Writing and hand writing</li> <li>❑ Language structure and use</li> </ul>	<ul style="list-style-type: none"> <li>❑ Numbers, operations and relationships</li> <li>❑ Patterns, functions and algebra</li> <li>❑ Space and shape (geometry)</li> <li>❑ Measurement</li> <li>❑ Data handling</li> </ul>	<ul style="list-style-type: none"> <li>❑ Beginning knowledge                             <ul style="list-style-type: none"> <li>o Natural science</li> <li>o Social science</li> <li>o Technology</li> </ul> </li> <li>❑ Physical education</li> <li>❑ Personal and social well-being</li> <li>❑ Creative arts                             <ul style="list-style-type: none"> <li>o Dance</li> <li>o Drama</li> <li>o Music</li> <li>o Visual Art</li> </ul> </li> </ul>	Water play (stoep) Sand box Fantasy and dramatical play Book corner Listening corner Blocks + _____ Discovery area Writing corner Music corner Learners' puppet show TV – box	Sensory materials: <ul style="list-style-type: none"> <li>• Sound games (cd's)</li> <li>• texture matching</li> <li>• "feely box"</li> <li>• fastening tools</li> </ul> Manipulation toys <ul style="list-style-type: none"> <li>• puzzles</li> <li>• pegboards</li> <li>• beads to string</li> <li>• shoelace cards</li> <li>• stacking toys</li> <li>• picture lotto's (memory games)</li> <li>• dominoes</li> <li>• magnets</li> <li>• magnifying glasses</li> </ul> Constructions toys: <ul style="list-style-type: none"> <li>• small building blocks</li> <li>• LEGO®</li> <li>• interlocking toys</li> </ul> Educational games: <ul style="list-style-type: none"> <li>• board games</li> </ul> (e.g. "What's in the square") <ul style="list-style-type: none"> <li>• card games</li> <li>• sorting games according to: colour, shapes, kinds, texture etc.</li> </ul>	Water play Sand play Mud play Sensory table Fantasy- and dramatic play Climbing Swinging Block play Ball play Wheel toys Woodwork Art outside Gardening Caring for animals
Theme discussion Story Puppet show Dramatisation Rhyme Perception Additional language: <ul style="list-style-type: none"> <li>• incidental</li> <li>• purposely</li> <li>• song</li> <li>• rhyme</li> <li>• action</li> </ul>	Preparatory mathematics activity Maths story Perception Counting rhyme Fantasy (shop)	Art and hand work:( 2D & 3D) Movement Activities: Music Technology (Engineering) Science Baking activities Religious Education Outings Birthday celebrations Register Weather chart			

Source: (Van Heerden & Esterhuizen, 2021:155-257).

**APPENDIX D:  
LESSON PLAN DOCUMENT**

**Preparation**

**Introduction:**

**Development:**

**Conclusion:**

**Resources:**

<b><u>Class activity</u></b>	<b><u>Curriculum content</u></b>
<b><u>Outcomes</u></b>	<b><u>Assessment</u></b>
<b><u>Executive function skills</u></b>	<b><u>Play activity</u></b>

## APPENDIX E: CONSENT FORM: PRINCIPAL

### Requesting consent to do a research project with preschool teachers.

Dear Principal

I am a PhD student in Early Childhood Education at the University of Pretoria. I am currently busy with a research project titled “The role of structured play in facilitating preschool learners’ executive functions”. According to the literature, executive function is a cognitive and behavioural skill that controls or plans our thoughts and behaviour; this is necessary in attaining any goal or learning task. For the completion of this study, I am required to both interview and observe preschool teachers in order to determine how executive function can be implemented through structured play and gain an understanding thereof.

I would like to request that you kindly grant me an opportunity to interview you about questions surrounding executive function and structured play. My reason for conducting this study is based on numerous learners not being ready for formal education. Research has found that learners who lack executive function stand a great chance of experiencing problems in formal school. Hence the study will explore how preschool teachers facilitate executive function through structured play.

Apart from conducting the interview, I would also like to request that I may be allowed to:

- sit in classrooms for a period of three hours to observe how teachers incorporate teaching techniques in their lessons **OR** record a lesson to observe the teaching techniques through video
- take photographs of games, learning materials and lesson activities;
- assess lesson plans to note how lessons are developed and applied in class; and
- use the data confidentially and anonymously for further research purposes, as the data sets are the intellectual property of the University of Pretoria. Further research may include secondary data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

Please be assured of the following:

1. The name of the school and the identities of the participants will not be disclosed. Pseudonyms will be used for the research site (school) and the participants (in-service teachers) in all reports.
2. All recordings, transcripts, interview notes and activity booklets will be stored on a password-protected computer and treated confidentially. Only the researchers and the supervisor will have access to the data gathered.
3. The data generated will only be used for academic purposes.
4. Participation is entirely voluntary, and the participants will have the right to withdraw at any time and without any prejudice.
5. No participant will be exposed to any acts of deception or risk of any kind.



6. No incentives will be offered to any of the research participants or the school.

Although the request to take part in this study includes interviewing teachers and later observing their lessons, the school may choose whether they would like to participate or not. If you do participate, signing a similar letter of informed consent will mean that you acknowledge the research topic and will contribute knowledge to it. The professional benefits that the participants will gain include obtaining more knowledge about executive skills – a vital tool that enables effective learning in class. With greater comprehension concerning this topic, teaching bodies can work towards improving cognitive skills and attaining academic success. Lastly, this empirical work will contribute to both my doctoral thesis and an academic article on enhancing executive function through structured play.

Please indicate whether you are willing to participate by filling in the permission slip. I shall collect these slips from your school. You are also welcomed to contact me should you have any queries.

Yours sincerely,

\_\_\_\_\_

**E. Etokabeka**

██████████

\_\_\_\_\_

**Dr J. van Heerden (supervisor)**

judy.vanheerden@up.ac.za

***PERMISSION SLIP FOR RESEARCH***

I \_\_\_\_\_, hereby give permission to **Elsa Etokabeka** to

- interview preschool teachers of the school
- sit in the classrooms for a period of 3 hours to observe the manner in which teachers incorporate their teaching techniques during lessons **OR** record a lesson to observe teaching techniques through video
- take pictures of games, learning materials and lesson activities
- assess lesson plans to note how lessons are developed and applied in class

These will all be done for her doctoral study. In participating, I understand the nature of the study and hereby give permission and ownership to not only record, but also utilise the given information under the term that both the school and teachers' identity remain anonymous, and that participation is voluntary. Teachers may withdraw at any time during the course of the study without any consequences.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## APPENDIX F: CONSENT FORM: TEACHER

### Requesting consent to conduct a research project with preschool teachers

Dear Teacher

I am a PhD student in Early Childhood Education at the University of Pretoria. I am currently busy with a research project titled “The role of structured play in facilitating preschool learners’ executive functions”. According to the literature, executive function is a cognitive and behavioural skill that controls or plans our thoughts and behaviour; this is necessary in attaining any goal or learning task. For the completion of this study, I am required to both interview and observe preschool teachers in order to determine how executive function can be implemented through structured play and gain an understanding thereof.

I would like to request that you kindly grant me an opportunity to interview you about questions surrounding executive function and structured play. My reason for conducting this study is based on numerous learners not being ready for formal education. Research has found that learners who lack executive function stand a great chance of experiencing problems in formal school. Hence the study will explore how preschool teachers facilitate executive function through structured play.

Apart from conducting the interview, I would also like to request that I may be allowed to:

- sit in your classroom for a period of three hours to observe how you, as a teacher, incorporate teaching techniques in lessons **OR** record a lesson to observe your teaching techniques through video
- take photographs of games, learning materials and lesson activities;
- assess lesson plans to note how lessons are developed and applied in class; and
- use your data confidentially and anonymously for further research purposes, as the data sets are the intellectual property of the University of Pretoria. Further research may include secondary data for teaching purposes. The confidentiality and privacy applicable to this study will be binding on future research studies.

Please be assured of the following:

7. The name of the school and the identities of the participants will not be disclosed. Pseudonyms will be used for the research site (school) and the participants (in-service teachers) in all reports.
8. All recordings, transcripts, interview notes and activity booklets will be stored on a password-protected computer and treated confidentially. Only the researchers and the supervisor will have access to the data gathered.
9. The data generated will only be used for academic purposes.
10. Participation is entirely voluntary, and the participants will have the right to withdraw at any time and without any prejudice.

11. No participant will be exposed to any acts of deception or risk of any kind.
12. No incentives will be offered to any of the research participants or the school.

Although the request to take part in this study includes interviewing you, the teacher, and later observing your lessons, you may choose whether you would like to participate or not. If you do participate, signing a similar letter of informed consent will mean that you acknowledge the research topic and will contribute knowledge to it. The professional benefits that the participants will gain include obtaining more knowledge about executive skills – a vital tool that enables effective learning in class. With greater comprehension concerning this topic, teaching bodies can work towards improving cognitive skills and attaining academic success. Lastly, this empirical work will contribute to both my doctoral thesis and an academic article on enhancing executive function through structured play.

Please indicate whether you are willing to participate by completing the permission slip. I shall collect these slips from your school. You are also welcomed to contact me should you have any queries.

Yours sincerely

\_\_\_\_\_

**E. Etokabeka**

██████████

\_\_\_\_\_

**Dr J. van Heerden (supervisor)**

[judy.vanheerden@up.ac.za](mailto:judy.vanheerden@up.ac.za)

### ***PERMISSION SLIP FOR RESEARCH***

I, \_\_\_\_\_, hereby give permission to **Elsa Etokabeka** to:

- conduct an interview with me;
- sit in my classroom for a period of three hours to observe how I incorporate teaching techniques during lessons **OR** record a lesson to observe my teaching techniques through video
- take photographs of games, learning materials and lesson activities; and
- assess lesson plans to note how lessons are developed and applied in class.

These will all be done for her doctoral study. In participating, I understand the nature of the study and hereby give permission and ownership to not only record but also utilise the given information under the terms that the identity of both the school and the teachers remain anonymous and participation is voluntary. Teachers may withdraw at any time during the course of the study without any consequences.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **APPENDIX G: CONSENT FORM: PARENTS**

Dear Parent / Caregiver

### **APPLICATION FOR CONDUCTING RESEARCH INVOLVING YOUR CHILD**

I am a PhD student in Early Childhood Education at the University of Pretoria. I am currently busy with a research project titled “The role of structured play in facilitating preschool learners’ executive functions”. According to the literature, executive function is a cognitive and behavioural skill that controls or plans our thoughts and behaviour; this is necessary for attaining any goal or learning task. For the completion of this study, I am required to both interview and observe preschool teachers in order to determine how executive function can be implemented through structured play and gain an understanding thereof.

I wish to request your permission to include your child in this study, as learners are part of the participants from which data will be collected. The learners will be observed from afar to note how they interact with one another and respond when their teacher scaffolds executive function skills through structured play. In doing so, I kindly request the opportunity to take photographs of the children during lesson activities. Please be assured of the following:

1. The faces, identities and names of learners will not be disclosed. All faces and identities will be protected from being identified. Furthermore, pseudonyms will be used for the research site (school) and the participants (in-service teachers) in all reports.
2. All recordings, transcripts, interview notes and activity booklets will be stored on a password-protected computer and treated confidentially. Only the researchers and the supervisor will have access to the data gathered.
3. The data generated will only be used for academic purposes.
4. Participation is entirely voluntary, and all participants will have the right to withdraw at any time and without any prejudice.
5. No participant will be exposed to any acts of deception or risk of any kind.
6. No incentives will be offered to any of the research participants or the school.

The research will ultimately try to determine the factors that contribute to teachers’ understanding and implementation of executive functions. I also hope to share the obtained information with other teaching bodies within the education frame. Please indicate whether you are willing or not willing to have your child participate by completing the permission slip or opt-out form. I shall collect these slips from your school. You are also welcomed to contact me should you have any queries regarding the study.

Kind regards.

---

**E. Etokabeka**

---

**Dr J. van Heerden (supervisor)**

**PERMISSION FOR RESEARCH**

Your child's participation in this research is voluntary and confidential. The school and your child's name will not be identified within the research. If you have any questions about the research, you are welcome to contact me, Elsa Etokabeka, [REDACTED]

I, \_\_\_\_\_, the parent/guardian of \_\_\_\_\_  
in Grade \_\_\_\_\_, give permission that Elsa Etokabeka can use my child as a participant in her research study.

\_\_\_\_\_  
Signature of parent/guardian

\_\_\_\_\_  
Date

**OPT-OUT FORM**

I, \_\_\_\_\_, the parent/guardian of \_\_\_\_\_  
in Grade \_\_\_\_\_, **DO NOT** give permission for Elsa Etokabeka to use my child as a participant in her research study.

\_\_\_\_\_  
Signature of parent/guardian

\_\_\_\_\_  
Date

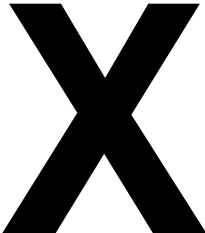
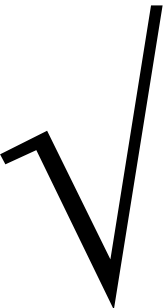
**APPENDIX H:  
ASSENT FORM: LEARNERS**

**Assent form for preschool learners.**

Is it ok to come and see how you work in class?

The cross means no and the tick means yes.

Please colour the block to answer the question.

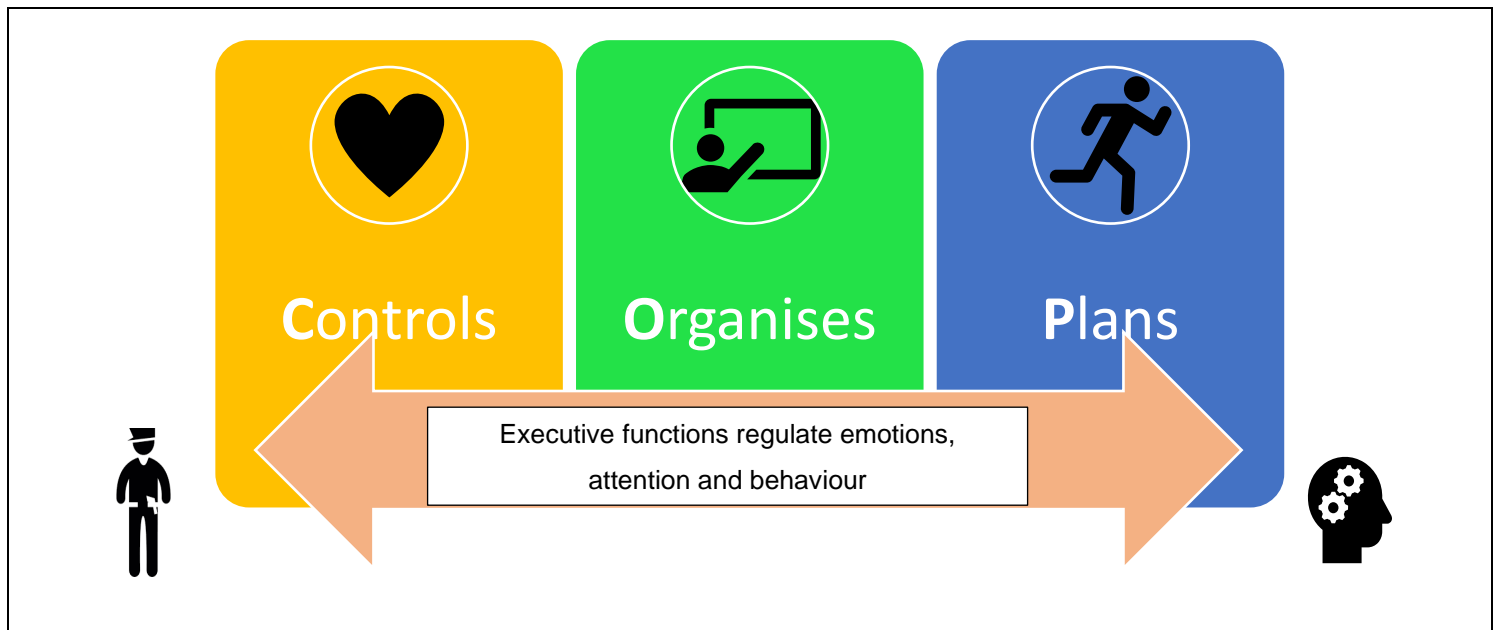
	
--	--

Thank you.

## APPENDIX I: ELABORATION POSTERS FOR TEACHERS

*Executive functions* operate as a mental **COP** (Controller, Organiser, and Planner) that implements a needed structure to execute tasks.

Just as a police officer implements law and order, executive functions regulate our emotions, attention, and behaviour so that we humans can obtain our objectives.






**HERE IS WHAT TO THINK ABOUT BEFORE STARTING A NEW TASK:**

1. **STOP** 
  - Stop what I am doing.
2. **THINK** 
  - What do I need to do?
  - Do I have a checklist that I can use?
3. **PLAN** 
  - Plan the steps needed to finish the task.
  - Fill out the checklist that I can use.
4. **DO** 
  - Sit down and start working!

K&M Center  
1454 Cloverfield Blvd. Suite 210  
Santa Monica, CA 90404  
(310) 582-1563 ext. 102



## Results

4	Working Memory	The ability to remember information for immediate use.
1	Organizing Materials	The ability to organize objects in work, play, and storage areas.
2	Planning Tasks	The ability to manage tasks by setting goals and developing steps to achieve the goals.
6	Emotional Control	The ability to regulate emotional responses to stress.
1	Initiating Work	The ability to get started on tasks without many prompts and cues.
4	Inhibiting Behavior	The ability to stop one's own behavior at an appropriate time.
4	Monitoring	The ability to judge the quantity and quality of one's work based on expected standards.
5	Shifting to New Tasks	The ability to transition from one activity to another.

Higher scores may indicate your strengths in Executive Functioning.  
Lower scores may highlight areas of weakness.

Results Continue

**APPENDIX J:**  
**ETHICS LETTER: UNIVERSITY**



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA  
Faculty of Education

**RESEARCH ETHICS COMMITTEE**

**CLEARANCE CERTIFICATE**

CLEARANCE NUMBER: EDU084/19

**DEGREE AND PROJECT**

PhD

The role of structured play in facilitating  
preschool learners' executive functions

**INVESTIGATOR**

Ms Elsa Etokabeka

**DEPARTMENT**

Early Childhood Education

**APPROVAL TO COMMENCE STUDY**

27 November 2019

**DATE OF CLEARANCE CERTIFICATE**

28 October 2021

**CHAIRPERSON OF ETHICS COMMITTEE:** Prof Funke Omidire

A handwritten signature in black ink, appearing to be 'FO', written over a horizontal line.

**CC**

Ms Thandi Mngomezulu  
Dr Judy van Heerden  
Dr Hannelie du Preez

This Ethics Clearance Certificate should be read in conjunction with the Integrated Declaration Form (D08) which specifies details regarding:

- Compliance with approved research protocol,
- No significant changes,
- Informed consent/assent,
- Adverse experience or undue risk,
- Registered title, and
- Data storage requirements.

**APPENDIX K:**  
**ETHICS LETTER: DEPARTMENT OF BASIC EDUCATION**



**GAUTENG PROVINCE**

Department: Education  
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

**GDE RESEARCH APPROVAL LETTER**

Date:	11 August 2020
Validity of Research Approval:	04 February 2020 – 30 September 2020 2019/565
Name of Researcher:	Etokabeka EMC
Address of Researcher:	[Redacted] Street Kilner Park Pretoria
Telephone Number:	[Redacted]
Email address:	Elsa.marlyse@gmail.com
Research Topic:	The role of structured play in facilitating pre-schoolers executive function
Type of qualification	PHD
Number and type of schools:	4 ECD Sites
District/s/HO	Tshwane East ,Johannesburg North

***Re: Approval in Respect of Request to Conduct Research***

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

*[Signature]* 11/08/2020

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1. Letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.

*Making education a societal priority*

**Office of the Director: Education Research and Knowledge Management**

7<sup>th</sup> Floor, 17 Simmonds Street, Johannesburg, 2001  
Tel: (011) 355 0488  
Email: Faith.Tshabalala@gauteng.gov.za  
Website: www.education.gpg.gov.za

**APPENDIX L:  
PICTURE SETS OF PARTICIPANTS AND RESEARCH SITES**

FIGURE	PICTURES	DETAIL
<p>Figure 4.5: The effect of COVID-19 pandemic on play</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1</p> </div> <div style="text-align: center;">  <p>2</p> </div> <div style="text-align: center;">  <p>3</p> </div> </div>	<ol style="list-style-type: none"> <li>1. Social distancing spaces (T4)</li> <li>2. Refrain from physical engagements (T3, T4)</li> <li>3. Refrain from touching toys (T3)</li> </ol>
<p>Figure 4.6: materials/resources used for structured play</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>1</p> </div> <div style="text-align: center;">  <p>2</p> </div> <div style="text-align: center;">  <p>3</p> </div> </div>	<ol style="list-style-type: none"> <li>1. Store-bought materials (T2)</li> <li>2. Made materials (T3)</li> <li>3. Natural materials (T7)</li> </ol>



Figure 4.7:  
Teachers guiding preschoolers to get organised for activities



1



2



3

1. Models (TO7), Provides resources (TO2)
2. Seating/settling preschoolers (TO2)
3. Arranging the space (TO5, TO6)

Figure 4.8:  
Approaches used to facilitate executive function



1



2



3

1. Dance/music (TO2, TO5, TO8)
2. Songs/Rhymes (TO2, TO4)
3. Class routine (TO1-TO4)
4. Movement activities (TO4, TO8)
5. Child-led/discovery (TO1, TO8)



4



5

Figure 4.9:  
Examples of open  
and closed-ended  
resources



1



2



3



4



5

1. Animal toys, pegs (T7)
2. Playdough (T3)
3. Costumes (T8)
4. Elastic tying board (T4)
5. Matching shapes (T4)

Figure 4.10:  
Teachers' role(s)  
during structured  
play



1



2



3



4



5

1. Supporter, Regulator (TO1)
2. Facilitator, Questioner (TO5)
3. Observer, Monitor (TO3)
4. Assessor, Instructor (TO4)
5. Reminder (TO8)

Figure 4.11:  
structured play  
facilitating  
executive function



1



2



3

1. Songs and music (L4)
2. Movement exercises (L2)
3. Following routine (L2)



<p>Figure 4.12: Evident executive function during structured play</p>	 <p>1 2 3 4</p>	<ol style="list-style-type: none"> <li>1. Planning/organising (L2)</li> <li>2. Cognitive flexibility (L4)</li> <li>3. Task initiation (L1)</li> <li>4. Attention (L5)</li> </ol>
<p>Figure 4.13: Evident structured play activities</p>	 <p>1 2 3 4</p>	<ol style="list-style-type: none"> <li>1. Speed/racing (T1)</li> <li>2. Assorting games (T5)</li> <li>3. Memory games (T2)</li> <li>4. Games with toys (T8)</li> </ol>

**APPENDIX M:  
PROCESS OF IDENTIFYING THEME AND SUB-THEMES**

SUB-THEMES:		THEME:	
-Teaching techniques -Resources		-Teachers' roles -Challenges and benefits	
INTERVIEW		OBSERVATION	
DOCUMENT ANALYSIS			
Enhancing executive function through structured play			
<ol style="list-style-type: none"> <li>1. What do you think executive function means?</li> <li>2. What do you think structured play means?</li> <li>3. Do you think executive function and structured play is important for learning; if so why?</li> <li>4. How do you plan for structured play and how often is it implemented?</li> <li>5. How do you approach teaching executive functioning through structured play (eg the techniques)?</li> <li>6. Which materials/resources do you use for structured play?</li> <li>7. What do you as a teacher do when children are engaged in structured play activity (role)?</li> <li>8. What do you find challenging when teaching executive function through structured play?</li> <li>9. What benefits do you experience when facilitating executive function through structured play?</li> <li>10. Do you use children's preferences and interests when planning structured play or is it mostly themed/activity-based?</li> </ol>	<p><b>TEACHER</b></p> <ol style="list-style-type: none"> <li>1. Which of the executive function skills are taught during the learning experience?</li> <li>2. How does the teacher guide children to get organised for the activity?</li> <li>3. Which approach does the teacher utilise to facilitate executive function during structured play?</li> <li>4. What open and closed resources are used to develop executive function?</li> <li>5. How does structured play activity support the acquisition of executive function skills?</li> <li>6. What challenges does the teacher face whilst facilitating executive function?</li> <li>7. What is the teacher's role(s) during structured play activity?</li> </ol> <p><b>CHILDREN</b></p> <ol style="list-style-type: none"> <li>1. Do children easily follow the teacher's instruction during the activity?</li> <li>2. What executive function skill do children struggle with the most?</li> <li>3. What benefits do preschoolers experience when exercising executive function through structured play?</li> <li>4. How do the children manage and organise the activity presented by the teacher?</li> <li>5. Is there any evidence of indecisive behaviour by the child during the activity?</li> <li>6. How does structured play facilitate executive function in children?</li> <li>7. What are the emotional and physical responses of the child during structured play?</li> <li>8. What executive function skills are evident when children engage in structured play?</li> <li>9. What approaches were used to help children acquire executive function skills?</li> <li>10. Any evident examples of structured play activities to help children acquire executive function skills?</li> </ol>	<p><b>LESSON PLAN</b></p> <ol style="list-style-type: none"> <li>1. Class activity</li> <li>2. Curriculum content</li> <li>3. Outcomes</li> <li>4. Assessment</li> <li>5. EF skills</li> <li>6. SP activity</li> <li>7. Resources</li> </ol>	

**APPENDIX N:  
TEACHERS' PROFILES**

Brief description of self

Qualification

Years of experience

Brief description of school

E.g. special programmes, language, socio economic status, facilities, area

Number of learners in class