




Exploring South African preschool teachers' roles and responsibilities with executive functions



Authors:

Elsa Etokabeka¹ 
 Judy van Heerden¹ 
 Hannelie du Preez² 

Affiliations:

¹Department of Early Childhood Education, Faculty of Education, University of Pretoria, Pretoria, South Africa

²Department of Humanities Education, Faculty of Education, University of Pretoria, Pretoria, South Africa

Corresponding author:

Elsa Etokabeka,
 elsa.marlyse@gmail.com

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Background: South African studies based on school readiness found that most children who commence formal schooling (from Grade 1) lack the basic skills needed to adapt within the learning environment – these include having challenges to follow instructions, work autonomously or focus on a task.

Aim: The national guideline for teaching children between birth to 9 years does not specify how early childhood education programmes can facilitate or strengthen executive function (EF) skills through structured play. Structured play, can be understood as play activities that require guidance and instructions for completion. During the activities, the participants have to follow instructions in order to attain the outcome. Hence, there is a need to explore how EF skills can be developed through structured play. From our understanding, EF is an individual's cognitive ability to regulate thoughts and actions needed to complete a task. Executive function skills assist learners to adjust and work effectively later (Grade 1) in a formal learning environment to perform academically.

Setting: The study was conducted at preschool sites that follow different educational approaches. They are Montessori, National Curriculum Framework (NCF), Reggio Emilia and Independent Schools Association of Southern Africa (ISASA) preschools. The preschools are situated in affluent suburbs of Pretoria, Gauteng. In this article, learners refer to children aged 4 years in the Grade RRR class.

Methods: A qualitative multiple case study design was utilised. We interacted with two teachers from four schools who followed different educational approaches. The data collection techniques included individual semi-structured interviews, lesson observation and document analysis, whilst photographs and field notes were taken when the teacher-participants interacted with learners during a planned learning experience. The generated data sets were inductively analysed and interpreted using the theoretical frameworks of sociocultural theory and metacognition.

Results: The interpreted data sets revealed that the preschool teacher-participants can facilitate EF using games, songs, movement exercises or racing competitions. The participants explained that indoor, outdoor and learning experiences facilitated EF skills such as self-regulation, working memory and cognitive flexibility during structured play.

Conclusion: There is a need for preschool teachers to identify EF in the curriculum and know how to link and intentionally include the skills in daily learning experiences. This will ensure learners acquire EF and apply it in formal learning environments. The contribution to the body of scholarship is the development of guidelines for teachers to intentionally and explicitly develop EF skills using structured play. We confer that teachers play a role in enabling fun, engaging and hands-on activities that promote the acquisition of EF in the early years.

Keywords: executive function; metacognition; preschool; structured play; planned lessons; play-based pedagogy.

Introduction and background

The transition from preschool to formal school (Grade 1) can be overwhelming for learners as learning corners, play-based activities and open spaces are replaced with lines of desks, a chalkboard and ringing bells indicating periods. Furthermore, the learners are affected by socio-emotional experiences in trying to adapt to a formal learning environment, requiring the means to cooperate and engage with fellow peers. Sasser, Beekman and Bierman (2015:681) found that learners who enrol for Grade 1 often commence schooling with inadequate cognitive and self-regulation skills such as finding it difficult to follow instructions or remain attentive during tasks, and these skills encapsulate the body of executive function (EF) skills. Therefore, the study

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focuses on learners aged 4 years, as EF has been noted to develop faster between the ages of 3–5 years. Executive function is defined on the basis of three skills, namely, the working memory, inhibitory control and cognitive flexibility (Messer et al. 2018:2). The three skills regulate our thoughts and actions, which ultimately determine how we achieve a goal. Diamond (2013) pointed out that these actions assist us to refrain from engaging in unnecessary activities and remain focused on completing a task and achieving the desired goal.

According to Traverso, Viterbori and Usai (2019:2–3), the development of EF during the early years (3–5 years) has notable effects on lifelong learning. Firstly, EF enables learners to work flexibly when solving problems. Secondly, EF facilitates learners to operate in rule-based situations where they need to abide by instructions, and this includes regulating one's behaviour and selecting appropriate responses (Sasser et al. 2015). Lastly, EF operates as a mental guide, especially when working in different environments to achieve a goal. Executive function skill combines an array of cognitive and behavioural competencies and dexterities to complete a task; it promotes school readiness and equips learners with the necessary skills to adjust effectively in class and enables academic success (McClelland & Cameron 2019:144). Barker and Munakata (2015) revealed that poor EF would result in learners struggling to prioritise, complete a task or overcome a challenge. Thus, in teachers understanding their role to facilitate EF through structured play, it will assist learners to attain the necessary skills for formal schooling. Research on EF in the South African context mostly focuses on older age groups (11 years and older) that include adolescents and tertiary students (Britz & Van Zyl 2020). Thus, this article aims to broaden this scope of knowledge by exploring how teachers with different educational approaches enhance EF within the South African preschool context with the focus on 4-year olds.

In South Africa, the National Curriculum Framework (NCF) and National Early Learning and Development Standard for children from birth to 4 years old (NELDS) are guidelines that facilitate learners to attain emotional, physical, cognitive and social development (DBE 2015:35). The activities therein support the preparation of formal schooling (DBE 2015:35). Therefore, to explore teachers' roles and responsibilities in facilitating EF through structured play, the study included four different curricula and educational approaches, namely, (1) the Montessori approach, (2) the Reggio Emilia approach, (3) the NCF of South Africa and (4) the ISASA curriculum. We wanted to unpack and scrutinise how these curricula/ approaches cater to teaching EF through structured play.

Structured play promoting executive function

Considering that EF is the foundation for school readiness and academic success, preschool teachers ought to intentionally develop and exercise EF in learners (Rothlisberger et al. 2013:153). Fleeer, Veresov and Walker (2017:2) deemed play to be an imperative factor that can enhance EF as play promotes creativity, problem-solving and

group collaborations. Similarly, Yogman et al. (2018:2) agreed that as play develops the structure of the brain, it stimulates EF skills through engaging in different cognitive operations. One of the ways EF can be developed is through social engagements such as play and adult interactions (Duval et al. 2016). Structured play in particular has been noted to stimulate EF skills as many of its components (memory, attention, inhibitory control and cognitive flexibility) are active during the play activity (Medina & Sobel 2019:2).

Murata and Maeda (2002:238) described structured play as a form of play designed to attain a specific goal often directed by an adult (Bautista et al. 2019:715). The teacher determines the learning outcomes, control the use of resources during play, guide the way that learners play and steer learners towards different tasks with a specific objective in mind (Murata & Maeda 2002:238). Research exemplifies how learners who engage in structured play demonstrate greater EF such as inhibitory control, working memory and cognitive flexibility during play activities (Medina & Sobel 2019:2). This is because structured play strengthens learners' cognitive and physical skills as they navigate the play activity by using different tools, as well as applying various skills (Murata & Maeda 2002:238). Furthermore, the Center on the Developing Child (2016) noted various structured play games that enhance EF; these include movement games, rhythmic game songs and dancing games (Harvard University 2015:7). By structuring the learning environment in a specific way, structured play assists learners 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 under EF (Russell 2015).

The 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 towards reaching specific outcomes (Jensen et al. 2019:2). By doing so, teachers provide clues, suggestions, examples and alternatives during the lesson to attain a specific goal (Jensen et al. 2019). During a learning experience, the teacher imparts knowledge of the learning experience, outlines the learning objectives and is responsible for keeping learners focused on achieving learning objectives (Jensen et al. 2019:3). Although the teacher/instructor instigates play activities, learners are still in charge of figuring out how to attain the learning experience objective. Loizou (2017:785) suggested that the various functions and contributions of teachers include being an onlooker, supervisor, facilitator and, occasionally, a participant. Through this, teachers strengthen the means to explore and stimulate learning by leading learners to discover new ideas/methods/resources; this is attained by playing alongside them during games and probing their findings (Weisberg et al. 2013:105).

Bodrova and Leong (2010) noted that there is a:

[S]carcity 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. (p. 2)

Hence, this article explored teachers' roles in the development of EF using structured play. The role of the preschool facilitator is not simply to watch over the child engaged in play but to observe the activity to improve learning experiences, enhance better play techniques and challenge learners through the course of the activity (Hunter, Graves & Bodensteiner 2017). Although Hunter et al. (2017:89–90) highlighted how structured play equalises learning opportunities between adults and children, and its activities should strive to ingrain aspects of free play during its course, as it enables them to practice autonomy and self-regulation.

South African curricula and their integration with executive function

South Africa follows different learning curricula where one of them includes the Montessori approach. The Montessori approach postulates learners to be active beings, who are ready to learn through play, work and real-life experiences (Fitch 2013:1–5). In the Montessori approach, the classrooms are arranged according to multi-age grouping to encourage interactions through peer learning (Fitch 2013:1–5). Teachers in Montessori schools generally observe and guide learners; hence, they only assist learners if they are struggling to complete a task (Ozerem & Kavaz 2013:12). Knowledge and skills include discovery; exploring; independence; practical life skills; self-reliance; completion of tasks; self-learning; assembling/sequencing objects; and learning from subjects such as mathematics, language, science, geography, music and art (Ozerem & Kavaz 2013:13). There are no EF skills specifically outlined in its approach; therefore, EF is enhanced through activities associated with decision-making, working memory, self-regulation, planning, organising, attention and task initiation (Mooney 2013; Ozerem & Kavaz 2013:14).

The Reggio Emilia approach is based on relationships that look to stimulate learners' relationships with their peers, family, teachers, society and the environment (Thornton & Brunton 2015). In its learning, the learners get some control of their learning direction. Learners share their views, discoveries and mental strengths. Teachers then seek to illustrate ideas that encourage children to discover and investigate learning contents; hence, there are endless ways of learners expressing themselves. By doing so, teachers incorporate learners so they can be more involved, as well as take interest in what they do ultimately promoting a more

child-centred learning approach (Thornton & Brunton 2015). The Reggio Emilia applies different forms of learning that include drawing, creating, storytelling and performing. Furthermore, the approach emphasises hands-on activities, and therefore, learners get to discover what certain objects are used for which enables them to utilise their senses. As with the Montessori approach, there are also no EF skills specifically outlined in the approach; therefore, EF is also enhanced through activities associated with self-regulation, cognitive flexibility, planning and prioritising, organising and task initiation (Mooney 2013).

The NCF offers direction on how to progress an appropriate curriculum intended for babies and young infants. The objective of the curriculum is to enable all children to acquire knowledge, capabilities, mindsets and appropriate behaviours for life, school and the working environment (DBE 2015:2). Hence, the guideline supports adults to develop effective lessons through activities that would address children's interests and necessities within the learning context and incorporate national and international activities that work towards assisting babies and young (DBE 2015:2). Being the sole framework of early learning, the NCF is directed towards facilitating teaching and learning in the early years. Its knowledge pillars include well-being, identity and belonging, communication, exploring mathematics, creativity, knowledge and understanding of the world, which would overall promote the development of the child (DBE 2015:4). By identifying EF in the guideline, the guideline stipulates learners be able to (1) identify and solve problems and make decisions using critical and creative thinking; (2) work effectively as individuals and with others as members of a team; (3) organise and manage themselves and their activities responsibly and effectively; (4) collect, analyse, organise and critically evaluate information; and (5) encourage independence, self-control, cooperation and persistence to finish projects (DBE 2015:2, 4, 13).

Lastly, the Independent Schools Association of Southern Africa (ISASA) is founded on the present National Curriculum document that explored best learning practices within early childhood education (Independent Schools Association of Southern Africa – ISASA 2015:3). Although it is envisioned as a teaching guide for private schools, it can also be utilised by different learning environments. Its framework was developed bearing in mind the necessary steps of children's learning and

TABLE 1: A comparative overview of the curricula/approaches applied in the study.

Summary	Montessori	Reggio Emilia	NCF	ISASA
Teacher's role	'Quiet' observer	'Provoking' collaborator	Provides children with quality experiences and the opportunity to achieve their full potential	Nurtures the development of children who will be able to flourish in the modern world
View of the child	Naturally intelligent	Partners in learning	Children play a crucial role in their education and development	The 21st-century child
View on play	<ul style="list-style-type: none"> Play is the work of the child Explore with self-correcting materials independently 	<ul style="list-style-type: none"> Play is child-driven within the environment Collaborate with teachers, peers and community on group projects within the environment 	Play forms part of the learning experience	Plenty of opportunities to learn through play
Resources	Purposefully designed learning objects	Natural objects	Variety of objects, including natural elements such as water and sand	Child friendly, the items support the learning outcome
Evidence of EF in curriculum	Not explicitly taught or assessed	Not explicitly taught or assessed	Evident EF skills	Evident EF skills

NCF, National Curriculum Framework; ISASA, Independent Schools Association of Southern Africa; EF, executive function.

TABLE 2: Theoretical concepts infused participants and research sites.

Research sites	Montessori	Reggio Emilia	NCF	ISASA
Participants	Teacher 1 (T1) and Teacher 2 (T2)	Teacher 3 (T3) and Teacher 4 (T4)	Teacher 5 (T5) and Teacher 6 (T6)	Teacher 7 (T7) and Teacher 8 (T8)
Theme: Preschool Teachers' roles and responsibilities to teaching EF skills				
Scaffolding	<ul style="list-style-type: none"> Adapted lesson plan Adapted equipment 	<ul style="list-style-type: none"> Guided learning Collaborative learning Observe development 	Gradually building play activities	<ul style="list-style-type: none"> Assisting the child Enabling independent learning
More Knowledgeable Other	Teacher and equipment	Teacher, assistant and environment	Teacher and classroom	Teacher, assistant and communal playground
Zone of Proximal Development	I DO, YOU WATCH	YOU DO, I HELP	I DO, YOU WATCH	I DO, YOU HELP
Interactions	Teacher-child	Child-environment-teacher	Teacher-child	Teacher-child-assistant
Strategies	Shared demonstration	Independent practice	Demonstration	Shared practice

Source: Webb, S., Massey, D., Goggans, M. & Flajole, K., 2019, 'Thirty-five years of the gradual release of responsibility: Scaffolding toward complex and responsive teaching', *The Reading Teachers* 73(1), 75–83. <https://doi.org/10.1002/trtr.1799>

NCF, National Curriculum Framework; ISASA, Independent Schools Association of Southern Africa; EF, executive function.

development (ISASA 2015:3). The knowledge and skills attained include social and emotional development, cognitive and perceptual development, physical development, language and literacy, numeracy, knowledge and skills, and creative arts. These spheres are important as they represent the foundation for all imminent learning. In relation to EF, the ISASA curriculum outlines different forms of developing the skill; this includes enhancing self-regulation, good concentration, taking turns/sharing, drawing on previous experiences and knowledge (working memory), initiating, planning and completing tasks successfully within an appropriate time frame (ISASA 2015:4). The curriculum also encourages the use of various and appropriate thinking skills and strategies to organise, evaluate, compare and analyse information; demonstrate metacognition, awareness and understanding of own thought processes; and lastly, reflect, review and evaluate what needs to be done better (ISASA 2015:3–4).

Theoretical framework

As the article explored South African preschool teachers' roles and responsibilities, the study fused Vygotsky's sociocultural theory with an emphasis on the Zone of Proximal Development (ZPD), to understand teachers' roles during learning activities in different educational approaches (Leedy & Ormrod 2014).

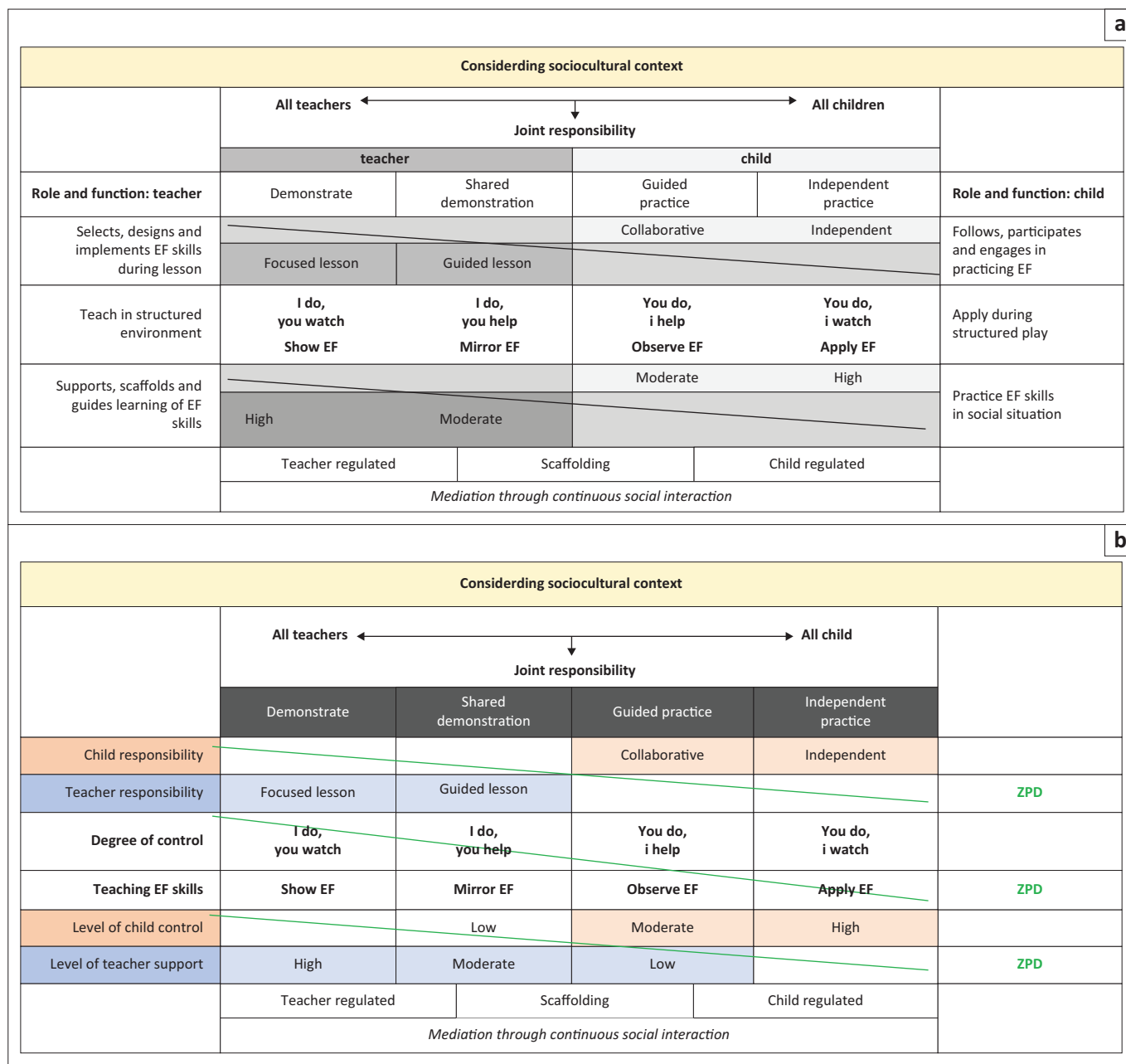
Sociocultural theory can be understood as the contribution society adds to human development (Kozulin 2003). The theory highlights how people and their environment permit growth. Lantolf (2008) noted that the theory offers means to understand the mind by evaluating interactions between people, tools and their objectives, for the sole reason of people forming and impacting social constructs. The sociocultural theory derives its tenets from how people interact within an environment to attain necessary cognitive development; thus, the ZPD was used in this context to explore teachers' roles and responsibilities to attain EF skills through structured play (Lantolf 2008). Zone of Proximal Development can be understood as the vastness between what children can achieve on their own, versus what they can achieve with the assistance of an adult (Kozulin 2003). It is 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 (Kozulin 2003; Van Oers et al. 2008:15).

Therefore, ZPD holds an imperative role in learning as the instructional tool enables children to be guided and to attain the necessary knowledge or skills (Mooney 2013:101).

Bodrova and Leong (2015:376) noted that ZPD determines the extent to which children are offered guidance and support to achieve an outcome. The conceptual illustration seen in Figure 1 presents the overlap between ZPD and EF. The framework holds that all learning takes place within a sociocultural context through mediation to help children make a connection with the real world, using *signs, tools* and *people* to interact and learn. Examples of tools and signs include 'language; various systems of counting; mnemonic techniques; algebraic symbol systems; works of art; writing; schemes, diagrams, maps and mechanical drawings as well as various conventional symbols' (Vygotsky 1981:137). Tools and signs are often used to facilitate learning or help children understand a topic. The figure reads from left to right, showing a gradual release of control and responsibility by the teacher to help the child take more responsibility and become an independent learner. Explicit and teacher-centred activities are gradually replaced with scaffolding and shared tasks so that the child becomes independent and self-regulated. The caption on the degree of control illustrates the purpose of the ZPD, namely: 'I do, you watch => I do, you help => You do, I help => You do, I watch'. These principles are also relevant to acquiring EF as it is not automatically acquired by a child and requires structural supportive interactions to support and guide the child to the next level of functioning and learning. According to Diamond (2013), children require scaffolding to stimulate learning and rehearse activities accurately. Should the teacher fail to offer scaffolding, children will most likely commit errors, struggle to understand the content and have incomplete tasks. By scaffolding, the child discovers various skills that can lead them to attain learning success. The theoretical framework enabled the study to comprehend the role of preschool teachers in enhancing EF through structured play. By doing so, the study outlined the techniques, teachers' roles and resources used during the learning experiences.

Research methodology and design

A multiple case study within qualitative research was utilised to develop a better understanding of how EF could be taught



Source: Webb, S., Massey, D., Goggans, M. & Flajole, K., 2019, 'Thirty-five years of the gradual release of responsibility: Scaffolding toward complex and responsive teaching', *The Reading Teachers* 73(1), 75–83. <https://doi.org/10.1002/trtr.1799>

ZPD, zone of proximal development; EF, executive function.

FIGURE 1: Zone of proximal development embedded within executive function (a–b).

using structured play. Four pedagogically different preschools, teaching learners between 0 and 5 years, were purposefully selected, namely, (1) Montessori, (2) Reggio Emilia, (3) NCF and (4) ISASA preschools. Our justification is firstly because of the different educational philosophies; secondly, to compare how EF is facilitated during structured play within different learning contexts; and thirdly, to scrutinise preschool curriculums where EF is explicitly taught and assessed. All the schools were situated in affluent areas where the learning materials and playground areas are vast, and some of these classrooms often had teaching assistants.

At these respective research sites, eight teacher-participants (two teachers from each school) responsible for the 4-year-old

age group were purposefully selected to participate in the different data generation activities. The purpose of focusing on this age group is because of EF rapidly growing during the age of 3 to 5 years (Diamond 2013:135). The other criteria of selecting the participants were based on the grounds that the school followed English as a medium of instruction, and teachers obtained formal education in teaching; this includes Bachelor of Education, National Diploma and Certificate in Early Childhood Education. The schools followed one of the following learning approaches (1) Montessori, (2) Reggio Emilia, (3) NCF or (4) ISASA learning approach. The data were obtained at the schools' premises during school hours as it provided access to the classrooms, resources and learning experiences.

The data generation included a pre-elaborative session with the participants in pairs summarising what EF entailed by using a poster. The pictures on the poster explained what EF is together with the examples found in classrooms. The teachers were then individually interviewed through semi-structured interviews. Once the interviews were completed, preschool teachers scheduled a day where they felt comfortable to be observed, as well as enable the researcher to take photographs and field notes of the learning experience, provided with written consent forms. Teachers were individually interviewed once for 45 min asking the same open-ended questions, whereas the observations were also done once done for a minimum period of 3 h.

Finally, a discussion of the learning experience was held to elaborate on the ideas the participants have when planning lessons, particularly addressing classroom activities that facilitate EF using structured play. Learners were present in the classroom during observations to note how the learning experiences and interactions transpired. We used qualitative data generation techniques that included individual semi-structured interviews, observations, artefacts (field notes and photographs) and documents to obtain a rich understanding of how EF is facilitated during structured play (Phillippi & Lauderdale 2018:381). After observations, the researcher probed the participants how their lesson plans assisted the roles teachers played during learning experiences; the purpose of this was to comprehend how teachers facilitate the development of EF in learners. Finally, ethical measures from the participants and the guardians of the learners were adhered to through the form of obtaining a written informed consent, as well as providing anonymity and confidentiality throughout the timing of the study.

Data analysis and presentation

Different data sets were inductively analysed to obtain the theme in relations to the phenomenon – preschool teachers' roles and responsibilities to teaching EF skills (Leedy & Ormrod 2014:18). The study interpreted this knowledge using the fused theoretical framework and scholarly literature to determine teachers' roles.

Data analysis and presentation

The theme of this study investigated the roles teachers experienced during structured play according to the different educational approaches. The NCF guide states that teachers ought to 'organise activities for the children to experience; model behaviour; play games alongside preschoolers; and offer more activities to strengthen various skills' (DBE 2015:21). Similarly, the ISASA document notes that teachers can 'participate in play; provides guidance in managing impulses; and sees that everyone participates in activities' (ISASA 2015:7). In relations to the theme, the participants were asked: what do you as a teacher do (what role do you play) when children are engaged in structured play activity?

The participants shared verbatim that:

'[I] 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.'¹ (T2)

'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.' (T1)

'[I] 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.'^{2,3} (T3)

'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.'⁴ (T4)

'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.'^{5,6} (T6)

'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.'⁷ (T5)

'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.'⁸ (T7)

'Asking questions.'⁹ (T8)

The observation also showed that:

Teachers managed and organised learning activities by providing seating structure, following routines, as well as reinforcing self-regulation actions (Learner Observations 1, 5 and 6). Activities in Learner Observations 1, 2 and 4 were teacher-led. The teachers provided information as well as instructions the learners had to fulfil. Learners would have to listen to the teacher and be seated in their correct places; hence, they did not require managing or organising the learning activity. For Learner Observations 3, 5, 6, 7 and 8, the activities were child-led making learners organise/manage themselves during a task. Secondly, learners got to choose what they wanted to do/work with and make sure they had the necessary materials.

Discussion

The roles of facilitating EF through structured play in all the schools consist of teachers *supervising* learners to attain the learning outcome (Dias & Seabra 2017). Learning outcome in

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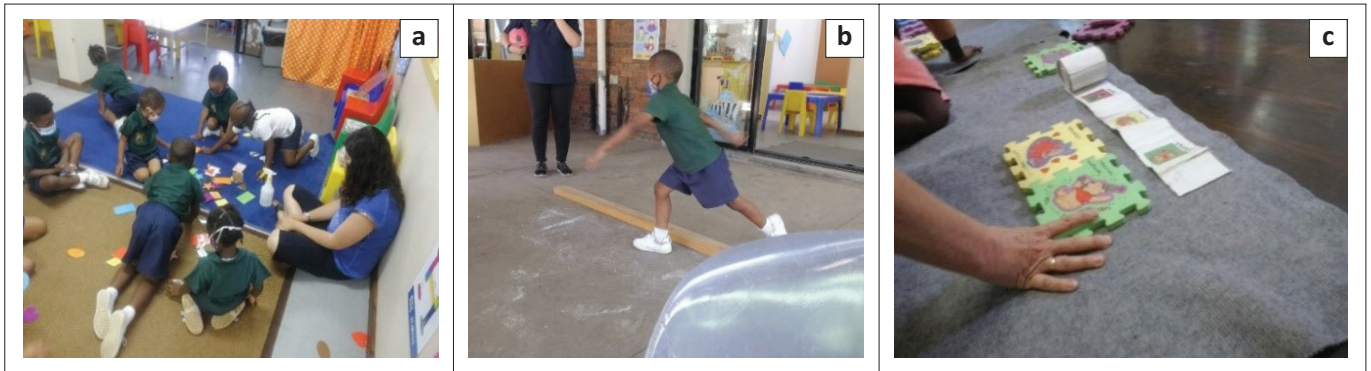


FIGURE 2: The demonstration of teachers' roles during structured play (a,b,c) in a Montessori classroom (Etokabeka 2021).

this case can be understood as the learning objective teachers aim to attain during the lesson. Similarly, all the participants explained that by supervising activities, teachers are required to *observe* what learners are doing and *follow up* on the progress/challenges learners experience (Teacher Observations 1–4). Supervision, according to the participants, consists of monitoring and observing learners. Furthermore, it ensures that learners perform their learning tasks correctly, remain on track with their work and complete the learning activity. Supervision allowed the participating teachers to have meaningful interactions with learners during tasks. Teacher Observations 5–8 would, for example, ask learners what they were busy with and how certain materials could be used; this helped the teachers understand what learners were doing to guide them in attaining the learning objective. Apart from supervising, teachers *motivate* learners to *persevere* whenever they lose interest in a task. One of the participants said that when learners got positive feedback, it encouraged them to keep learning and even to explore other, new areas of learning (Teacher Observation 4). Often, during a task, learners get wrong answers or miss steps in the activity; this can upset or leave them feeling like a failure. The main objective is to not have learners see themselves as a failure, instead focus on their abilities so they can develop confidence. In this way, teachers can help learners think differently and improve how they work in class. Structured play activities also enabled the *assessment* of learning outcomes and the progress learners make. Examples of assessments were evidently seen as Teacher Observation 5 and 7 noted some of the challenges and improvements learners made during lessons.

Meltzer (2010) noted that another role teachers can implement is *alternate* learning activities for the purpose of stimulating learners' mental skills, as well as develop cognitive flexibility. Concerning the roles of teachers, teachers should present a task in *different ways* so that learners can become accustomed to thinking and working differently (Meltzer 2010). Cognitive flexibility, according to Diamond (2013:14), is important for learning as it builds different strengths and capabilities and enhances problem-solving skills. As a result, learners can think differently and learn from different events. *Probing* – probing assisted the teachers to understand what learners were thinking and communicate their thoughts/actions out loud (Duval et al. 2016). Probing provides an overall idea to see whether learners' actions are correctly aligned with the

learning objective. From the data findings, some of the teaching techniques consisted of asking 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. In School 3 and 4 for example, when the teachers observed and followed the progress learners made, teachers would find some time to step in during the task and ask learners questions. However, in School 1 and 2, the teachers probed the learning activity to either recap the knowledge or test what learners learnt from the activity. Taken together, the result of this research was the same in all four schools. Being that teachers' roles during structured play are extensive, teachers are required to multitask. Although teachers act as guides during tasks, learners are responsible for reaching the learning outcome themselves. Teachers in this case simply facilitate the learning transition so that learners do not lose focus or give up before reaching the learning objective. The primary role of teachers is to ensure learning outcomes are achieved, same as structured play that work towards attaining specific outcomes.

Limitation and recommendation

The sample size consisted of visiting only one school per curriculum approach – an NCF, a Montessori, a Reggio Emilia and an ISASA preschool. Although the participants were a total number of eight preschool teachers teaching 4-year olds, results in all four schools were similar. Hence, it would have been interesting to visit more schools and further observe how teachers from the schools develop EF through structured play. The COVID-19 pandemic made it very challenging to obtain permission to enter schools (the result of having little to no contact with learners and teachers), which limited the number of schools in the study. It would have been interesting to note whether preschools that adopt and implement the same curriculum also taught EF through structured play in the same way. The study would have also benefitted from a longer observation period to see how often structured play activities were implemented in different times of the year. The study further would have benefitted from observing whether the teachers applied the same technique more than once and if their roles during structured play changed over time. Lastly, the study only explored the facilitation of EF in structured play in schools within more affluent areas.

Future research could explore how preschool teachers develop EF in poorer and rural areas. This is to note the teaching techniques and resources teachers in resource poor learning environments use to enhance EF. The study recommends that teachers learn more about EF and how the skill is necessary for learning, as well as how EF can assist learners with daily operations. The knowledge and skills about EF, as well as guidelines and tips on how to develop EF effectively, should be part of professional development. Schools should evaluate the classroom practices, materials and learning spaces in terms of supporting the development of EF and align learning experiences to improve EF. This includes using items such as natural objects, closed-ended toys and open-ended materials. The more exposure learners have with different kinds of resources, the better the chance of improving their cognitive flexibility. The ability to alternate tasks consists of integrating various play stations as the stations have different activities. In this way, learners would be exposed to working with different learning materials.

Conclusion

Executive function centres on cognitive and behavioural capabilities that enable learners to work effectively; it is for this reason the skill is developed during preschool years. Harvard University (2015) noted the importance EF has on learning as it enables learners to follow instructions, work flexibly and complete their work upon commencing formal schooling. It is for this reason that preschool teachers are required to know various roles that can facilitate the development of EF using structured play. In this article, we learnt that developing EF through structured play requires upholding various roles; these roles were facilitated through scaffolding and engaging with children during play. To conclude, teachers need to be equipped with the necessary knowledge and skills to implement both EF and structured play effectively.

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Competing interests

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Authors' contributions

All authors contributed equally to this work.

Ethical considerations

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Data availability

The data that support the findings of his study are available on request from the corresponding author, E.E.

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