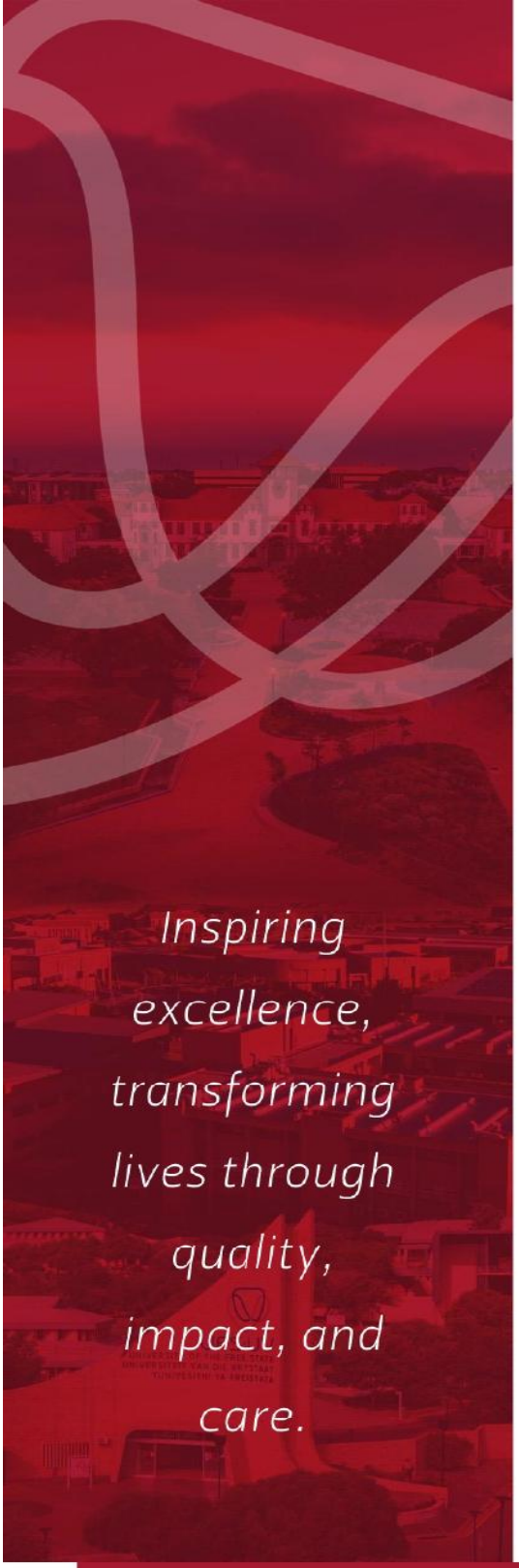

THESIS / DISSERTATION SUBMISSION

Exploring Strength-Based Approaches Using Mathematical Play Pedagogy in Lesotho Early Childhood Care and Education Settings

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Submitted in fulfilment of the requirements in respect of the Doctoral degree in Early Childhood Development and Learning
in the department of Early Childhood
in the faculty of Education at the
University of the Free State

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DECLARATION

I, ‘Marorisang Mary Dongwane (2006069534), declare that this thesis entitled *"Exploring Strength-based Approaches using Mathematical Play Pedagogy in Lesotho Early Childhood Care and Education Settings"* is entirely the result of my work except where otherwise indicated. I have acknowledged all sources used in this thesis, and no part of this thesis has been submitted to any university for any professional qualification.

Signature: Date: November 2024

DEDICATION

This thesis is dedicated to my loving family, whose steadfast support and encouragement have been the cornerstone of my academic journey. To my parents, whose sacrifices and belief in my abilities have shaped me into who I am today. To my partner, for his love, understanding, and patience during this process. To my siblings: thank you for your unwavering support and tolerance throughout these trying times.

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ABSTRACT

Learning mathematics is now required at all educational levels, including for those providing Early Childhood Care and Education (ECCE). In addition, studies have shown that play-based mathematics education enhances children's capacity for logical thought, problem-solving, and procedural understanding of addition, subtraction, multiplication, and division concepts. I believe that to assist children in attaining their maximum potential in mathematics learning, teachers must be aware of where children begin with mathematics and provide activities that help them develop their mathematical play. As a result, to sustain what works best for children and validate how it works so that it may be maintained and enhanced to meet the child's skills to promote play pedagogy, teachers in ECCE settings are advised to employ strength-based approaches. However, I observed that there needs to be more clarity, understanding, and analysis surrounding the purpose of the strengths approach and how it may be implemented in early childhood settings.

Against this background, this study explored strength-based approaches using mathematical play pedagogy in Lesotho's ECCE settings. The study focused on working with teachers to improve their teaching practices and enrich all the participants, who were seen as co-learners and co-researchers. This study followed a qualitative approach underpinned by an interpretive paradigm and adopted an interpretive phenomenology research design. Direct lesson observations and face-to-face semi-structured interviews were used as data generation tools to obtain data from eight female teachers in the ECCE settings of the Berea district in Lesotho. Purposive and convenience sampling techniques were adopted to choose the research sites and the participants, while thematic content analysis was utilised for data analysis. The study incorporated my background, positionality, and other prominent methodological aspects like data transcription, validity, trustworthiness, and ethical considerations.

Social constructivism and its principles were used in this study as a theoretical lens to explore strength-based approaches using mathematical play pedagogy to discover how children acquire, retain, and process information during teaching and learning in ECCE settings. The study's findings revealed that almost four out of five

strength-based approaches existed in the ECCE settings, although teachers' understanding of the strength-based approaches was unsatisfactory. Teachers used strength-based approaches when mediating their lessons but were unaware they were. The findings further highlighted that ready-made and homemade play materials were available and used to facilitate the playful learning of mathematics in the ECCE settings. The study also discovered that teachers need encouragement to use strength-based approaches, proper training specific to strength-based approaches, sponsored quarterly reflection meetings, and more parental engagement is essential.

Based on these findings, the study thus recommends that teachers be involved in continuing professional development to support them with correctly interpreting and enacting the curriculum and other policies. Moreover, teachers need to form professional learning communities to share the best practices and transform their practices primarily to enhance quality education in ECCE settings. Another recommendation is that the teaching service department recruit teachers with higher qualifications to improve the ECCE workforce. Lastly, the study recommends that the government provide countrywide ECCE settings with teaching and learning materials.

Keywords: Play, mathematical play pedagogy, strength-based approaches, social constructivism, early childhood care and education setting.

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LIST OF ACRONYMS/ABBREVIATIONS

CECE	Certificate in Early Childhood Education
CHAT	Cultural-Historical Activity Theory
ECCD	Early Childhood Care and Development
ECCE	Early Childhood Care and Education
ECD	Early Childhood Development
ECE	Early Childhood Education
ELDS	Early Learning and Development Standards
EYPC	Early Years Planning Cycle
LCE	Lesotho College of Education
MoET	Ministry of Education and Training
NCTE	National Council of Teachers of English
NGO	Non-Governmental Organisation
RFF	Roger Federer Foundation
SBA	Strength-Based Approaches
SDG	Sustainable Development Goals
TCA	Thematic Content Analysis
TLMs	Teaching and Learning Materials
TSD	Teaching Service Department
VEYLD	Victorian Early Years Learning and Development
ZPD	Zone of Proximal Development
UNICEF	United Nations International Children’s Emergency Fund

CHAPTER ONE: CONTEXTUALISING THE STUDY

> Research and legislative efforts, development programs, advocacy, and the ideas and philosophies that guide preschool practice are all ways early childhood care and education quality are shown. (Gyekye-Ampofo, Opoku-Asare & Andoh, 2023:81)

1.1 Introduction

The 2030 Agenda by the United Nations, launched in 2015, marked the commencement of the global momentum decade of effort to implement Sustainable Development Goals (SDGs) to eradicate poverty and strive for peace, prosperity and opportunity for all in a productive world (United Nations, 2020). According to Diale and Sewagegn (2021), the fourth goal of the 17 SDGs is to transform the world by providing quality education. The goal aims to promote lifelong learning and ensure inclusive, high-quality education for all (United Nations, 2020:9). Diale and Sewagegn (2021) also draw attention to defining quality education using the 2030 SDGs as a reference point. The above scholars describe quality education as education that prepares students for life, not just for tests, and considers each student's social, emotional, mental, physical, and cognitive development regardless of gender, race, ethnicity, socioeconomic status, or geographic location (Diale & Sewagegn, 2021:3).

According to the United Nations (2020), seven targets of the fourth goal advocate equitable quality education to all boys and girls in all levels of education, including pre-primary, primary, secondary and tertiary. The goal intends, among others, to increase the number of youth and adults who have relevant technical and vocational skills for employment, decent jobs and entrepreneurship (United Nations, 2020). More so, the goal aims to eliminate gender disparities in education and ensure equal access to all levels of education, including vocational training for vulnerable children and persons with disabilities. Other targets include ensuring that all youth and adults achieve literacy and numeracy and ensuring that all learners acquire the knowledge and skills needed to promote sustainable development, human rights, gender

equality, peace and non-violence, global citizenship and cultural diversity (United Nations, 2020).

Lesotho as a signatory to the SDGs and other international protocols and conventions, calls for access, relevance, quality and equitable education and protection of children (Ministry of Education and Training [MoET], 2021:i). Similarly, Lesotho's education sector plan for 2016–2026 is guided by four main pillars, namely access, quality, equity and relevance emanating from the tenets of Education For All (EFA) and SDGs principles and frameworks (MoET, 2016). As a result, Lesotho is improving access to quality and relevant education and training at all levels, ensuring that curricula and materials are relevant to the needs of Lesotho, strengthening leadership, accountability and governance at all levels of the education sector, promoting gender equality and ensuring empowerment to disadvantaged groups and ensuring equivalence, harmonisation and standardisation of the Lesotho education and training system with international education goals (MoET, 2016).

More specifically, the second target of SDG four is the main area of this research because it entrenches the importance of early learning. The target above aims to verify that by 2030, all girls and boys have access to high-quality early childhood development, care, and pre-primary education to prepare them for primary school (United Nations, 2020:1). Achieving the SDGs and universal primary education requires pre-primary education. Therefore, one of the most important strategies for enhancing learning and education outcomes and the effectiveness of education systems is to guarantee access to high-quality pre-primary education (Education Commission, 2016). Crucially, a core element to consider for quality programming for young children is learning through play or playful learning, which is essential to good teaching and instruction for young children (UNICEF-Lego Foundation, 2018:1).

For the attainment of the second target of the fourth goal, various efforts are employed in Lesotho. In 2019, Early Learning and Development Standards (ELDS) were developed to inform the revision of the Lesotho Early Childhood Care and Development (ECCD) curriculum in 2021 (MoET, 2021). In addition, Lesotho is currently rolling out a new curriculum and also implementing the School Readiness Initiative (SRI) mainly for transitional assessment of children from pre-primary to primary

education. Most importantly, 68 reception classes were attached to primary schools in 2023 to improve access to comprehensive early childhood care and development, especially for the most vulnerable and disadvantaged children (MoET, 2023).

Despite Lesotho's commitment, pre-primary education is not universally accessible, with reception classes available in 309 primary schools out of 1 487 (MoET, 2023). The Gross Enrolment Rate (GER) in pre-primary education is 36 per cent, implying limited access with less than half of the children receiving early childhood education (MoET, 2020). According to MoET (2020), the following challenges are evident: scarce data on ECCD hindering the development of targeted educational interventions, inadequate in-service training, lack of parental education, infrastructure that does not adequately support children with disabilities, and the socio-economic status of many households that prevents enrolment in fee-based pre-schools. Lastly, the enforcement of national policies for integrated ECCD is also limited, and there is inadequate budget allocation for ECCD (MoET, 2020).

In line with the above discussion, this study explored strength-based approaches (SBAs) using mathematical play pedagogy in Lesotho Early Childhood Care and Education (ECCE) settings. This chapter, therefore, offers the background context and significance of the investigation, how the research topic is defined, the study's goals and objectives, and the research questions. The research methodology and theoretical perspectives are briefly included because both guided this study. The key concepts are defined to offer a thorough explanation of the phenomena investigated and the study's ethical issues are addressed. Lastly, a detailed outline of the chapters is shown and discussed, followed by a summary.

1.2 Contextual Background of the Study

Lesotho's earliest childcare centre was established in 1972 in the Maseru district and guided by women's groups. The idea was introduced by nine nurses who worked for the Lesotho National Council of Women (LNCW), a women's organisation and the Lesotho Day Care Community Centre after visiting Israel (Tlaitlai, Makurunge & Bhila, 2021). In expanding the background knowledge in this aspect, the said researchers indicated that since then, the proliferation of Early Childhood Care and Development (ECCD) services includes those called crèches, kindergartens,

preschools and childcare centres among others (Tlaitlai, Makurunge & Bhila, 2021:45).

The Lesotho Preschool Daycare Care Association was formed in 1983 with support from the Danish Volunteer Service as an umbrella for such schools to liaise with the MoET and advocated the creation of an ECCD Unit or department within the ministry in 1995. As a result, the preschools were absorbed into the MOE in Lesotho. They were officially called ECCD centres and the MoET (2013) also recognised the presence of Lesotho's ECCD programme. The ECCD unit was commissioned to develop policy, Early Learning and Development Standards (ELDS), offer in-service programmes and advocate ECCD (MoET, 2021).

In 2000, non-fee community-initiative preschools called home-based centres were established in Leribe and Mohale's Hoek districts and were later accessed countrywide. Home-based centres were established for vulnerable children whose parents could not pay fees. Presently, there are 65 home-based centres nationwide. In 2006, MoET attached only 242 reception classrooms to existing primary schools countrywide to adhere to the Education for All principles (MoET, 2021).

According to the most recent Lesotho Government Statistical Bulletin (MoET, 2020), the net enrolment rate in early learning establishments is 47 447 children with over 3 000 teachers. The bulletin further indicates that out of the total enrolment of 47 447 children in ECCD centres, 474 (0.9%) had some form of disability. Most crucially, it is also highlighted in the above document that out of more than 2 000 ECCD centres, only 191 are formally registered with the MoET. Therefore, data on ECCD education is difficult to collect and capture due to poor formal registration of centres and/or home bases which result in inadequate coverage of these centres (MoET, 2020:5).

In the meantime, Lesotho is improving access to all-inclusive ECCD for the most susceptible children by attaching reception classes to the remaining primary schools (MoET, 2016) to fulfill SDG four, mainly the second target. This ECCD presents the Lesotho government's high emphasis on the protection, nourishment, growth, education, health and cleanliness of young children, from conception until age five through a multi-sectoral approach in which different line ministries and stakeholders work collectively (MoET, 2013:13).

The ECCD services are currently delivered through three primary modalities: private fee-based daycare centres and centres for children from birth to two and for ages three to five respectively; home-based services for vulnerable children and orphans that are provided without charge; and reception classes connected to certain primary schools for children aged five that are fully funded by the government (MoET, 2021:11). The ECCD settings ensure the smooth transition to primary school with the provision of pre-reading, pre-writing, speaking, and listening communication skills in Sesotho and English, as well as numeracy skills for addition, subtraction, multiplication, and division. (MoET, 2021:34).

In early education curricula, there has reportedly been a shift towards play-based education in several countries, including the United Arab Emirates, Canada, Sweden, China, New Zealand and Lesotho, according to Danniels and Pyle (2018:1). As a result, play-based learning is the foundation of the Lesotho ECCD Curriculum Guide 2021 (MoET, 2021:14). According to Vogt *et al.* (2018), a teaching method known as play-based learning blends child-directed, light-hearted components with some adult supervision and learning objectives that are scaffolded. In addition, according to Vogt *et al.* (2018), the foundation of early childhood education is play and playfulness.

In this regard, Harris and Petersen (2019) maintain that children's early reading and math scores have been shown to benefit from play-based learning strategies. Evidence also suggests that play-based learning is more effective than direct instruction or unstructured play (Griswold, 2018; Pyle & Danniels, 2017). Contrarily, while play and play-based educational techniques are used and incorporated into early education curricula for children in preschool settings (Nicholson, 2019), as children get older, the perceived value of play declines as engaging play-based strategies are replaced with teacher-led, sit-down academic lessons (Paterson, 2020:97).

Teachers, therefore, should be conscious of their role in promoting play, even if it is widely accepted as a crucial learning path in ECCE settings (Vogt *et al.,* 2018), particularly in mathematics (Vu, Han & Buell, 2015:443). Teachers emphasise that play should be the foundation of early learning (Gripton & Williams, 2023) and that

mathematical activities should be integrated into everyday circumstances (ECMG, 2022). Recently, ECCE settings have focused on teacher-directed academic instruction (Hesterman, 2018; Paterson, 2020), with children being passive receivers of knowledge; and as a result, children's playtime is declining vigorously (Pyle & Danniels, 2017).

In the context of Lesotho, a lot needs to be done to improve and attain quality teaching and learning in ECCE settings. As an [1]ECCD inspector, I have discovered that excellent mathematics instruction and learning happen via play, which gives young children additional learning opportunities. However, it is recommended that teachers devise innovative approaches to early mathematics compatible with early childhood pedagogy to comprehend the mathematical play programmes children need to be exposed to and conceptualise the ECCE environments. Considering this, researchers have begun highlighting the need to shift studies from deficit-based approaches to strength-based ones using play pedagogy in ECCE settings (Caiels *et al.,* 2023; Fenton, MacDonald & McFarland, 2016).

Against this background, this study explored SBAs using mathematical play pedagogy in Lesotho ECCE settings. My greatest interest in this topic was motivated by personal experiences as an ECCD inspector during school support visits and inspections. Recently, mathematics education has become essential at different levels of education, including the ECCE level (Reikeras, 2020). Reikeras (2020) further noted that all children have capacities to obtain basic mathematical knowledge. Askew and Venkat (2020) maintained that mathematical play-based learning improves children's capacity for logical reasoning, problem-solving and procedural knowledge of addition, subtraction, multiplication and division facts. Therefore, as a researcher, I believe that teachers need to determine children’s initial

[1] MoET employee who inspect the work of ECCD schools, provide support and advice for such schools, submit quarterly and annual reports to the minister on the performance of the education system, ensure evaluation of overall school performance and of individual teachers, appraise the performance of school principals and inspect and report on such schools or class of school as may be specified.

mathematics skills and provide activities encouraging them to enhance their play with mathematics to reach their full potential in mathematics learning.

According to MacDonald *et al.* (2021:89), teachers in ECCE settings adapt their lesson plans to the play behaviours of their children to maximise their mathematical abilities. For instance, children are frequently taught to count through activities such as counting the number of times a ball bounces or the amount of time before a leap. The play incorporates notions of measurement: huge and little in ball kicking, rapid and slow in cycling, and tall and taller in measuring each other's heights and volumes in cooking. Teachers in ECCE settings are urged to employ SBAs to preserve what works best for the child and validate how it works so that it may be sustained and modified to fit the children's ability to support play. However, the literature indicates that the meaning of the SBAs and how it can be actualised in early childhood settings has not been well articulated, understood or questioned (Fenton *et al.*, 2016). Moreover, the evidence suggests that relatively little is known about SBAs (Caiels *et al.,* 2023).

Therefore, there needs to be more research that documents SBAs using mathematical play pedagogy in ECCE settings. Several studies in this area have focused explicitly on the challenges (deficits-based approach). For instance, environmental crisis (Solare-Rojas *et al.,* 2022), educational resources (Diale & Sewagegn, 2021; Solis & Isoda, 2022), pedagogical skills (Haile & Mohammed, 2017), mathematical competencies (Vogt *et al.,* 2018), inappropriate curriculum (Akinrotimi & Olowe, 2016) teachers' beliefs and practices (Bubikova-Moan, Hjetland & Wollscheid*,* 2019), absence of indoor and outdoor equipment for mathematical play (Ntumi, 2016), lack of adequate training centres for teachers to improve their qualifications (Feza, 2016), and the teacher/child ratio (Jensen *et al*., 2019) highlighting the deficits-based approach. This deduction led to the conclusion that, rather than concentrating on and sticking with the issue or worry, there is little empirical research examining SBAs in action and chances to enhance and strengthen preexisting strengths and capacities. Hence, the study aimed to explore the SBAs using mathematical play pedagogy in Lesotho ECCE settings.

1.3 Significance of the Study

I considered it significant and much-needed to conduct a research study to explore SBAs using mathematical play-based pedagogy in ECCE settings. This was to understand the SBAs supporting mathematical play pedagogy in ECCE settings and the existence of SBAs supporting mathematical play pedagogy in ECCE settings and examine the ways of strengthening mathematical play pedagogy using SBAs in ECCE settings.

Therefore, based on the phenomena being studied, the research design and the technique used, the study's conclusions might enhance teachers' understanding of SBAs using mathematical pedagogy in early learning environments. This might verify the existing and effective SBAs in ECCE settings and help examine how to strengthen mathematical play pedagogy using SBAs. The results might also be valuable to teachers, children, parents, institutions and policymakers. I believe that the study's conclusions may make it easier for the participating teachers to advocate play-based mathematical teaching and learning in ECCE settings because the results shaped the recommendations of this study emanating from their lived experiences.

Children might benefit directly because SBAs support integrated play-based pedagogy in teaching and learning; they acknowledge that each child possesses unique strengths and talents that teachers should consider when teaching. The generated findings might also inform teacher training institutions, curriculum development and teaching strategies in early childhood education to equip and enhance teachers' strategies to integrate play as a teaching and learning tool in mathematics in ECCE settings. Since ECCE services in Lesotho are provided through a multi-sectoral approach that supports the engagement of various ministries, development partners, non-governmental organisations and other parties involved, legislators, parents and other pertinent stakeholders will also benefit from planning and implementing successful mathematical play programmes in ECCE settings.

Most significantly, the research might add to the corpus of information already in existence because it is evident that research is scarce on SBAs, as many studies focused on the deficit-based approach (see Solare-Rojas *et al.,* 2022) for environmental crises, Akinrotimi and Olowe (2016) for inappropriate curriculum, Bubikova-Moan *et al.* (2019) for teacher's beliefs and attitude, Diale and Sewagegn (2021) and Solis and Isoda (2022) for educational resources, Haile and Mohammed (2017) for pedagogical skills, and Vogt *et al.* (2018) for mathematical competencies and that SBAs in early childhood environments have not been thoroughly discussed, comprehended or examined (Fenton *et al.*, 2016).

1.4 Defining the Research Problem

For over two decades and despite numerous efforts to improve mathematics levels in school-age children in Lesotho, children's mathematics performance in Lesotho schools has been vigorously downgraded (MoET, 2016). This situation calls attention to this issue which keeps growing as a national issue (MoET, 2023). The MoET (2016) further indicates a reduction in the standard of mathematics instruction at all levels, including the ECCD level. The recent findings of the Lesotho Multiple Indicator Cluster Survey (MoET, 2019) revealed that 47% of children who do not have numeracy (mathematics) skills and 54% of children without reading skills come from the bottom two-fifths of the country's wealth distribution. This also speaks to the Lesotho ECCD National Study (World Bank, 2018) findings, which affirmed that the direct assessment measures included items in mathematics/numeracy, language/literacy, executive function, and fine motor skills.

More specifically, in mathematics, the results showed that children could generally count from one to 14, with a range of counting abilities from one to 30, and children could name less than three numbers out of the 10 numbers presented. Therefore, it can be concluded that at every level of Lesotho's educational system, there is a clear lack of proficiency in mathematics. Research shows that through mathematics education, children begin to know the world around them and realise it through concrete actions, interaction with others and problem-solving (Beke, 2017:187). Hence, improving performance in science and mathematics at all levels of teaching and learning, suitable institution curricula, and best practices in teaching at all levels

are some of the long-term national goals. Another goal is to turn tertiary institutions in the education sector into world-class institutions (MoET, 2016).

In addition, the Examination Council of Lesotho (ECOL, 2021) also indicated a downward trend in mathematics achievement for most children. Therefore, it seems reasonable to infer that early mathematics still needs to be improved in most children who enter the formal school environment in Lesotho. Because early childhood education serves as the basis and preparation for future successes, it is essential to obtain insight into the methods of early childhood teachers and the quality of early childhood mathematics now delivered in early childhood settings (MoET, 2020:5).

Finally, literature provides several reasons for the importance of foundational mathematics: early childhood mathematics education has more significant long-term positive effects on children's future academic success and access to the labour market later on (Lebihan & Takongmo, 2018:2); Children have a great deal of intuitive knowledge about mathematics when they enter school; this knowledge is a base for developing formal mathematics in a school setting (Reikeras, 2020); there is a relationship between early mathematical knowledge and later achievement (MoET, 2020); and that the main determinant of later achievement is a quality investment in early mathematical experiences (Early Childhood Mathematics Group [ECMG], 2022).

Based on the above inferences, I argue that more research is needed. Implementing research findings may lead to reversing poor performance if implemented as intended. Hence, the present study sought to explore the SBAs using mathematical play-based pedagogy in Lesotho ECCE settings.

1.5 Aim, Objectives and Research Questions of the Study

1.5.1 Primary aim

This study aimed to explore teachers' SBAs to support children’s mathematical play pedagogy in ECCE settings.

1.5.2 Secondary objectives

To achieve the primary aim of the study, the following secondary objectives were addressed:

1. Explore teachers' understanding of SBAs supporting mathematical play pedagogy in ECCE settings.
2. Explore the existing SBAs supporting mathematical play pedagogy in ECCE settings.
3. Explore how Teaching and Learning Materials (TLMs) facilitate mathematical play pedagogy using SBAs in ECCE settings.
4. Examine how to strengthen play pedagogy to support mathematics learning using SBAs in ECCE settings.

1.5.3 Primary research question

How do teachers support children's play pedagogy in mathematics using SBAs in the ECCE settings?

1.5.4 Secondary research questions

1. What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?
2. What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?
3. How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?
4. How do SBAs support and strengthen mathematical play pedagogy in ECCE settings?

1.6 Theoretical Perspectives

Lev Vygotsky's (1978) social constructivism provided the framework for the current study. The claim that the researcher must be explicit about whatever specific theory is connected to the investigation drove the choice of social constructivism (Nhase, 2019). I believe that SBAs aligned well with the theoretical tenets of Vygotsky's

social constructivism theory, which is why this theory was chosen and applied in this investigation. In 1968, Vygotsky suggested social constructivism as a learning theory. The acquisition, retention and processing of information by children during instruction are all explained by learning theories.

According to Vygotsky's (1978) social constructivist theory, language and culture are the frames through which people see, interact with, and comprehend reality. Social constructivist theory implies that language is used to convey ideas, which are then interpreted and understood via experience and interactions in a cultural context. Extending on this idea, Vygotsky acknowledged that the creation of cognitive frameworks needs the language and cultural diversity of a group of individuals; knowledge is not only socially produced but also co-created.

Vygotsky also pronounced that how people think and see the world is greatly influenced by their language and culture. Building on this definition, evidence from research affirms that according to social constructivism, knowledge is not an individual experience but rather a shared one that results from several social processes and interactions (Akpan *et al.,* 2020; Lynch, 2019). Therefore, social constructivism in this study was applied as a theoretical lens to explore SBAs using mathematical play pedagogy to discover how children acquire, retain and process information during teaching and learning in ECCE settings.

I employed the following social constructivist principles in this study: zone of proximal development (ZPD), scaffolding by Bruner (1974; adopted into Vygostky’s work in later years), mediation, language, social interaction and cultural context to discover the SBAs revealed by instructional techniques used in interactive teaching and learning. These approaches helped in understanding the role played by language during engagements between the children and teachers, the influence of cultural tools in the facilitation of lessons and most importantly, the kind of support teachers offer children during play pedagogy in ECCE settings to help them realise their greatest potential. The above principles were important because the study aimed to explore teachers' SBAs supporting children’s mathematical play pedagogy in ECCE settings (see Section 1.5.1). The next subsections give a brief account of the principles underpinning this study.

1.6.1 The ZPD and scaffolding in learning

Vygotsky propounded the ZPD in 1968. The difference between a child's developmental level as assessed by autonomous problem-solving and their prospective development level as assessed by working with more experienced peers or under adult supervision while addressing problems was emphasised in Vygotsky's definition of the ZPD (Vygotsky, 1978:86). Vygotsky believes that offering children the appropriate assistance while they are in the ZPD for a particular task can motivate them to complete it. Social contact with a skilled teacher who lets children see and practice their abilities and offers scaffolding and supportive activities are all important to children as they are led through the ZPD – these are the key elements that teachers are encouraged to concentrate on to help a child move through the ZPD.

This study determined the opening between children's actual and prospective developmental levels when children were doing tasks under teacher guidance. This was also evident through school instructions offered in the participating ECCE settings. To explore the SBAs in the ECCE settings to address the second research question (see Section 1.5.1), the ZPD assisted me in figuring out what the children could do on their own and what they could accomplish with a teacher's support and encouragement. Most importantly, the instructional social interactions through which the teacher modelled the strategies, activities or tasks of learning and then moved this responsibility to the children, assisted me in seeing their SBAs in the ECCE settings. My analysis of lesson observations through the lens of the ZPD also aided in detecting the instances where teachers provided scaffolding or support to help children reach their potential during their lessons. This implies that these instances were significant in identifying the themes that shaped the findings of this study.

1.6.2 Mediation in learning

According to Vygotsky’s theory, mediation is prominent in comprehending how societal, institutional and historical contexts influence human mental functioning. These settings influence and supply the cultural skills that people learn to develop this functioning (Vygotsky, 1978). Vygotsky also claims that a physical tool, a system of symbols, especially language, or another person’s social behaviour might be the

source of mediation. He believes that signs are auxiliary means of solving a given psychological problem (Vygotsky, 1978:52). Vygotsky (1978) further acknowledged that learning mediation uses cultural techniques to accomplish objectives and gives learning significance for cognitive change. According to Ramasike (2016), learning mediation is used to determine how knowledge is gained during the learning process. This study's mediation process was significant for addressing the second and third questions in Section 1.5.4, with data collected through lesson observations and semi-structured interviews. This theoretical principle was intensively used to analyse data gathered to achieve this study's second and third objectives.

Within the framework of my research, how teachers mediated the teaching and learning of mathematics through play using SBAs, how resources were used, and how the language of learning (English) influenced understanding, were major indicators showing how the mediation process was carried out in every ECCE setting that was studied. It is worth mentioning that the medium of instruction used in the participating schools went against the Lesotho Education Language Policy (MoET, 2019) which stipulates that from grade zero to grade three teaching is provided in Sesotho as the mother tongue.

Mavuru and Ramnarain (2019) maintain that children's inborn language has the potential to be a resource instead of being perceived as a hindrance. Consequently, their mediation was also influenced by culture and language which are significant tools in the mathematical play classroom. It also aligns with Vygotsky's description of mediational methods which refers to unique approaches under certain circumstances (Vygotsky, 1978). Hence, I used this mediation principle to understand how the participants in their various settings or schools dealt with SBAs using mathematical play pedagogy through lesson observations.

1.6.3 Social interaction and learning

Vygotsky (1978) believed that social interaction is essential to cognitive growth and that learning is a socially influenced process. He expanded on this idea in 1981 and regarded social circumstances as the origin of development. According to Vygotsky, growth occurs as an intra-psychic category between two or more persons. In agreement, researchers (Daneshfar & Moharami, 2018; John-Steiner & Mahn, 1996)

opined that an individual's growth depends on the transmitted experiences of others. According to McRobbie and Tobin's (1997) theory of social and individual planes, knowledge is first obtained through the intra-psychological plane (assimilation and internalisation of learnt information) and then through the inter-psychological plane (interactions with individuals and the immediate environment) for personal worth. McRobbie and Tobin (1997) and Stott (2016) maintain that learning does not occur in isolation, and notably, social and individual interactions with others support mental processes and functioning at all levels (Scott & Palincsar, 2013; Vygotsky, 1981). Therefore, social interaction was prominent in this study because, through direct classroom observations, I discovered whether participants engaged children in socially interactive activities that stimulate thinking.

In this study, the social interaction space had a significant influence. For instance, the interactions between teachers, children and peers in the participating ECCE settings offered possibilities for conversations, meaning making and exchanging various viewpoints, highlighting the significance of robust collaborative learning experiences emphasised by the social interaction principle. This situation enabled me to determine participants' knowledge of the concepts and ideas surrounding SBAs to respond to the study's first research question, "*What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?"* More so, the same interactions made it possible to see, through the direct lesson observations, the SBAs that were evident during the teaching and learning processes – this evidence helped to respond to the second research question, "*What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?"* Most importantly, this evidence collected through observation sheets also informed data analysis and the study's findings.

1.6.4 Language in Learning

According to Vygotsky's theory, language and culture offer humans a framework for understanding, communicating and engaging with reality. Vygotsky argues that language and culture play a critical role in children's intellectual development and worldview because learning concepts are expressed employing language and interpreted and comprehended through interactions and experience within a cultural

framework (Vygotsky, 1978). Since teachers also use language to help children, language is crucial for implementing the constructivist learning theory. Speech allows children to communicate what they have learnt and researchers (Akpan *et al.,* 2020; Leeds-Hurwitz, 2009) considered language an essential tool for people to create reality. This implies that in social constructivism, children's knowledge is affected by adaptable interactions using the actual environment and interactions between people in a culturally meaningful and relevant world, made so mainly by language.

In this study, the language teachers used determined how they mediated mathematical play pedagogy through SBAs. For instance, English was a medium of instruction dominantly used in all the participating ECCE settings. It is also worth noting that Sesotho was rarely used. Hence, teachers considered the language used when mediating or communicating ideas and mathematics concepts to children during classroom interactions. This is motivated by Vygotsky's (1978:25) notion that

> the importance of a child's words in achieving the objective is equal to that of action. Children don't just talk about what they are doing; their speech and behaviour are intertwined as a single, intricate psychological process to find a solution to the issue at hand.

In particular, Vygotsky (1986:18) authenticated that thinking takes the form of play in early learning before reality happens. Vygotsky further indicated that play dominates. There is so much imagination in a child's mind that it is hard to tell the difference between it and the purposeful creation that they think is reality (Vygotsky, 1986). The bottom line is that in early learning environments, social interactions, language, communication and academic skills are intertwined within play (Walther, 2019:11).

1.6.5 Cultural context

According to Vygotsky (1978), education aims to impart cultural skills, like language, so that children may think creatively and coherently and have the courage to articulate their opinions. Vygotsky contended that culture significantly impacts and shapes development because, according to Gupta (2006) and Vygotsky (1978), experiences and information are generated and expanded within the contexts of society. Hence, culture has a significant influence on development. A similar view is

postulated by Windschitl (1999:752), who added that children undergo intellectual changes as they make sense of formal educational experiences concerning what they already know, the social and cultural settings in which ideas are expressed, and various other influences that mediate understanding. This is evident in the classrooms when sensitive teachers consider children's cultural diversity to strengthen teaching and learning chances and developmental opportunities in educational settings (Mavuru & Ramnarain, 2017; Mori, 2014). As stated in Section 3.2.3, cultural tools are given to children during social interactions to facilitate understanding, clearly indicating what happens in the classroom setting. This concept authenticates Lee (2015), who opined that teachers' use of cultural resources or tools in the classroom reveals a great deal about their familiarity with their children's backgrounds including culture.

In line with this study, the teachers, as the more knowledgeable others in the ECCE settings, were the prominent figures because they had to show that they understood their children, their contextual histories, the school culture and the cultures of their settings throughout the mediation process. This study found that each of the factors above contributed to the planning of the lessons taught during lesson observations, including how the participants made accommodations for their children when using mathematical play pedagogy in early learning environments to explore SBAs. This suggests that the child is integrated into the cultural activities at home, in the classroom and the community. This also means that children can express their thoughts and make sense of their reality (Fleer & Pramling, 2015).

According to Vygotsky, authentic learning occurs in the social constructivist activities included in the ZPD, allowing children to internalise more complex psychological processes. Once more, teachers (participants) played a crucial role in providing their children with the activities within their ZPDs and scaffolding them to reach their maximum potential (Vygotsky, 1978). In general, this study's cultural aspects were related to the resources used in the classroom, the language employed in mediation, and how participants interacted with the children to achieve the learning objectives (Haimene, 2023).

1.7 Research Methodology

The study followed a qualitative approach that calls for non-numerical information (Creswell, 2020) and generates rich narrative data (Cohen, Manion & Morrison, 2018). The qualitative method was chosen for three reasons: it enabled me to comprehend the phenomena being studied from the viewpoints of the participants (Maree, 2020); it allowed numerous methods (semi-structured interviews and observations for this study) of information generation (Yin, 2018); and it also permitted me to understand teachers' practices to support children's playful mathematics learning using SBAs in Lesotho ECCE settings. In addition, an interpretive paradigm that focuses on relativism and gaining a grasp of the world via people's subjective experiences (Nieuwenhuis, 2016) was used in the study to describe, understand and examine how SBAs support teachers' mathematical play pedagogies in the natural settings of the ECCE classrooms where teaching and learning occurs.

The study followed an interpretive phenomenological research design. Tuohy *et al.* (2013) maintain that interpretive phenomenology is frequently known as hermeneutics, prominent in understanding and interpreting participants' experiences. Frechette *et al.* (2020) add that interpretive phenomenology emphasises meaningful interpretations drawn from literature, artefacts, human experience and other important sources. Therefore, the interpretive phenomenology design assisted me in exploring early childhood teachers' lived experiences and perceptions and enquiring into how these teachers personally experience and make sense of SBAs using mathematical play pedagogy in their daily practices. Most significantly, the interpretive phenomenological design allowed me to gather a rich and detailed understanding of teachers' perspectives, beliefs, the meaning they attach to their teaching practices and the essence of the experiences within their natural settings.

Direct lesson observations and semi-structured in-person interviews were employed as data generation instruments to obtain information from eight teachers in ECCE settings located in the Berea district of Lesotho. The data was collected in two distinct phases: lesson observations started the process, and semi-structured in-person interviews followed to probe the validity of results suggested by the lesson

observations. Most importantly, before data collection and analysis, consent was obtained from the participants to record the interviews, which were then transcribed verbatim.

Convenience sampling using purposive criteria was used to choose the study sites and the participants. As an ECCD inspector, I used my field experience and expertise and purposely and conveniently chose qualified female ECCE teachers from four reception classes and four centre bases in both rural and urban regions – these were close to her place of residence and easily accessible. This is in line with what Etikan, Musa and Alkassim (2016:2) point to as convenience sampling – the target population is expected to fulfil certain practical requirements such as being easily accessible, being close by, being available at a specified time, or being ready to take part in the study. Finally, thematic content analysis was used for data analysis, followed by the presentation and discussion of the findings.

1.8 Defining Key Concepts

I found it essential to define some key concepts frequently appearing throughout the thesis report. The key terms include SBAs, mathematical play pedagogy and the ECCE settings. I used the literature to describe each concept in this study.

1.8.1 Strength-based approaches

The SBAs are explained by MacDonald *et al.* (2021:83) as educational practices that recognise and use children's strengths. The *Strength-based approach: Practice framework and practice handbook* (United Kingdom Department of Health and Social Care, 2019:24) defines the SBA as engaging with people to effect cooperative, solutions-focused change. The SBA originated in social work practice and psychology and is gaining recognition in several human service professions as an alternative to traditional, deficits-based treatment, emphasising individual pathologies (Swartz, Bartlett & Vele-Tabaddor, 2016) such as education, notably in early childhood education and health care (Pulla, 2017). The handbook (Department of Education and Early Childhood Development [DEECD], 2012:7) defines strengths as a child's intellectual, physical and interpersonal abilities, capacities, dispositions, interests and motivations. In a similar vein, strengths are characterised as such.

Furthermore, teachers must recognise children's strengths and interests to engage children in learning actively, according to the *Belonging, being & becoming: Early years learning framework for Australia* (Australian Government Department of Education [AGDE], 2022:9). This is further explained by the learning framework's commitment to equality, which holds that all children can flourish despite their unique backgrounds and skills (AGDE, 2022:13). The following activities, according to the DEECD (2012:8) complement the SBAs: 1) integrated teaching and learning approach; 2) reflective practices; 3) equality and diversity; 4) assessment for learning and development; and 5) parent inclusion. Equity and diversity, for example, ensure that each child's and their family's interests, skills and culture are recognised, appreciated and honoured. Cultural-historical activity theory (CHAT) is another tool that MacDonald *et al.* (2021:92) use to create a strength-based strategy to assist young children's early mathematics instruction. Culturally distinct meanings in instruments contribute to their mediating function. For example, most people link buttons with clothes. But in the early years of schooling, a box of buttons also has another contextually relevant meaning: it provides a pedagogical opportunity to teach higher-order ideas (such as categorisation and subitising).

1.8.2 Mathematical play pedagogy

According to the Early Childhood Mathematics Group's pedagogy statement (ECMG, 2022), mathematical play pedagogy is conceptualised as teaching strategies in early mathematics that encourage teachers to advance children's innate interest that may be piqued by playing with mathematics – seeing it as a social activity that is lively and untidy and encouraging application of mathematics in children's daily lives. Vogt *et al. (*2018) acknowledge that good mathematics pedagogy in early mathematics learning occurs when children play. Recent research points to eight essential principles which underpin good mathematics pedagogy in early educational settings (Gripton & Williams, 2023:6):

1) All children have the right to be mathematicians.
2) Mathematical development involves learning both mathematical behaviours and concepts.

3) Young children have different mathematical experiences but are not mathematically less capable.
4) Children have the right to a pedagogy that facilitates studying mathematics over its whole spectrum.
5) The teacher's understanding of the normal developmental pathways in mathematics should impact early mathematics practice.
6) Young children learn math via play and need time to (i) create their own ideas and conclusions, (ii) engage in play and interaction with adults, and (iii) take part in episodes directed by adults.
7) Teachers promote mathematics learning by continuously providing chances and a supportive atmosphere.
8) Children should have a variety of communication methods in their mathematical thinking.

Similarly, good mathematics pedagogy incorporates several meta-practices. These are enacted when teachers engage children in various mathematically based exercises inspired by children's passions, queries, worries and daily lives in a variety of subject areas (Dunphy *et al.,* 2014:9). As a result, it is reasonable to infer that teachers need to engage children in high-quality mathematical experiences, and that early childhood facilities must create successful play pedagogical approaches.

Evidence suggests that children in ECCE settings require assistance with their mathematics learning, according to Vogt *et al.* (2018:589). There has to be greater agreement on the optimum pedagogical strategy. Even if there are differences in the definition of play (Gasteiger, 2015), teachers emphasise that play should be the foundation of early learning (Gripton & Williams, 2023) and that mathematical activities should be integrated into everyday circumstances (ECMG, 2022).

In a similar vein, fewer studies have been done on the efficacy of this strategy since it has yet to be thoroughly compared in terms of the learning gains for children of various skill levels and children with different outcomes (Vogt *et al.,* 2018). A training programme on children's arithmetic competence and a play-based intervention were the two intervention groups that Vogt *et al.* (2018) compared. The results showed that while all children, from low to high proficiency, benefited from the play-based

approach, the training programme mostly benefited those with extremely low competency.

Furthermore, studies have demonstrated that play-based learning pedagogies enhance children's social skills and their overall classroom experiences, including assessments of teachers' sensitivity and routine management (Pyle & Danniels, 2017:6). It is commonly highlighted that play-based learning practices that are effective are essentially controlled by the children (Berk & Meyers, 2013; Weisberg, Hirsh-Pasek, & Golinkoff, 2013).

1.8.3 The ECCE setting internationally

A preliminary literature review focusing mainly on China, Nigeria, Namibia and South Africa was explored, vividly articulating the different interpretations when conceptualising the ECCE settings. Research has shown concern about what happens within ECCE settings and how the latter is conceptualised by teachers globally (Svensson, 2015:2). According to Li *et al.* (2014), Early Childhood Education (ECE) in China refers to early childhood education programmes serving children ages three to six when the foundations of physical, emotional, social and cognitive development are laid. Likewise, the informal, traditional upbringing provided from infancy until age three in Nigeria is referred to as the ECE setting to ensure school preparation (Obiweluozor, 2015:2). Early Childhood Development (ECD) is a comprehensive approach that addresses the needs of children from birth to eight years old (Ministry of Gender Equality and Child Welfare, 2017). In South Africa, it is known as ECD according to the National Integrated Early Childhood Development Policy (Department of Social Development, 2015). In Namibia, it is also known as all the services that support or promote the development of young children from conception to one year before they enter formal school. It is known as ECCD in Lesotho (see Section 1.2).

In light of this research, ECCE settings are preschools, kindergartens and other ECCD learning centres or classrooms for children from three years old to the beginning of primary school, which is typically at age six, which are designed to include educational content so that teaching and learning take place (United Nations International Children Emergency Fund, United Nations Education Scientific and

Cultural Organisation, the World Bank, the World Food Programme & United Nations High Commissioner of Refugees, 2020). Pianta, Downer and Hamre (2016) view ECCE settings as physical structures with well-defined spaces and organisation for different educational activities. The scholars mentioned above further indicate that specific areas and specific materials are the two sides of the same coin in the ECCE setting. Specific areas such as dramatic play areas, outdoor playgrounds, materials and facilities in good condition are available. The classroom has specific materials (i.e. blocks, books, play materials), a variety of materials, and most crucially, developmentally age-appropriate materials (Pianta, Downer & Hamre, 2016). As a result, the following concepts of ECCE settings, early learning environments, ECCE classrooms, early childhood classrooms and early educational settings were used interchangeably throughout the thesis.

1.8.4 The ECCE setting in Lesotho

The Lesotho ECCE setting is characterised by six learning areas or corners: literacy, numeracy, fantasy, construction/block, library and discovery (MoET, 2022). The manual defines a learning area as a specific location where TLMs are placed and organised in a classroom (MoET, 2022:15). The learning areas are arranged thematically according to the week's theme to allow children to participate in various self-selected activities during free play and for the provision and development of problem-solving skills, (MoET, 2022). In line with the above discussion, it can be argued that an ECCE setting must be spacious to accommodate six learning areas with relevant materials and allow free movement during free play. It should have storage to keep materials that are not in use because, according to Pianta *et al.* (2016), a well-organised ECCE setting is vital in ensuring that effective learning through play is happening wherever children are stationed.

1.9 Research Ethics

According to Kang and Hwang (2021:6), research ethics, including respect for persons, protection of participants, do-no-harm and distributive justice, remain a critical consideration in any research, and researchers need to act morally to ensure the participants' wellbeing. Therefore, it can be concluded that the researcher is required during the whole study procedure to safeguard the participants from any

damage resulting from the research process. Regarding this research, critical concerns of ethics were considered. I sought permission to conduct this research and adhere to the code of ethics for the University of the Free State under the General/Human Research Ethics Committee. The authenticity of this process was verified by a provision of an approval letter referenced UFS-HSD2022/0971/22 (see Appendix A).

Thereafter, consent was acquired from the Berea Education Office, the principals of the participating schools and teachers before conducting this research. The prospective participants were required to sign an informed consent form that gave a detailed study description. The permission documents ensured that the participants' in-depth understanding of the entire research process was solicited before the study commenced. The freedom to decline participation at any point during the research process was also disclosed to the participants (Cohen *et al.,* 2018). During the data generation and analysis processes, I ensured that the rights of the participants were not violated (Clark-Kazak, 2017). Anonymity through pseudonyms was used to protect the identities of the participating ECCE settings and teachers. The above processes are outlined in detail in Chapter Three, and all the permission letters and consent forms are provisioned in the appendix section.

1.10 Outlining Study Chapters

This section gives an outline of the study's chapters.

Chapter One: The Introduction and Background of the Study

This introductory chapter demarcated this study by providing a contextual background, describing the research problem, stressing the purpose, objectives and research questions as well as the research interest and study importance. It also briefly described the study's selected research strategy and its theoretical perspectives. It further described the fundamental concepts used throughout the thesis. The ethical issues were also briefly explored, and the chapter was concluded.

Chapter Two: Review of Related Literature

The phenomena covered are explained in-depth in this chapter. Existing works of literature from both national and international perspectives are investigated on play, mathematical play pedagogy and SBAs in the ECCE context. The overarching highlight of this chapter is that SBAs are increasingly seen as one path emerging from a new philosophy authenticating teachers employing robust SBAs that consider children's numerical skills – these approaches also consider what opportunities and resources are in place to aid in the growth of the children's abilities and talents to achieve the specified learning objectives (MacDonald, 2018). Hence, this study adopted positive psychology principles in education and incorporates and enacts SBAs (Noble & McGrath, 2015 in Galloway, Reynolds & Williamson, 2020) as an alternative positive approach.

Chapter Three: Theoretical Framework

This chapter discusses the social constructivist philosophy employed as a theoretical lens to understand SBAs using play pedagogy in ECCE settings. The mentioned theory is explored so that its principles and criticisms can be unpacked critically and analytically to understand their implications for this study. The chapter further examines social constructivism in ECE to justify its relevance to this study. In his justification of relevance, Omodan (2022) indicated that social constructivism is an idea that improves individual learning in educational institutions, classroom settings and beyond. The chapter ends with a provision of the principles underpinned by this study and a chapter summary.

Chapter Four: Research Methodology

This chapter offers a detailed and comprehensive discussion of the research approach, paradigm, design and methodology used to conduct this research. It includes my positionality, which informed the demarcation and sampling techniques. Instrumentation that guided the data collection phase of the current study is also explored in this chapter. The chapter further outlines the stages of data analysis and transcription. The chapter's closure includes discussions of the ethical issues

involved in research and the validity and trustworthiness of the study's methods and findings.

Chapter Five: Results and Analysis

Chapter Five outlines the study's findings and provides an analysis and discussion to address the research questions posed by the study and how SBAs can strengthen mathematical play-based pedagogy in ECCE settings.

Chapter Six: Summary, Recommendations and Conclusion

Chapter Six accomplishes four key tasks. It outlines the conclusions, illustrates how the study adds to the body of information already in existence, draws attention to the study's shortcomings and indicates areas that require more investigation.

1.11 Chapter Summary

This first chapter demarcated the study by providing the study's contextual backdrop, the definition of the research problem under exploration and the key terms frequently used throughout this thesis. A brief discussion of the qualitative approach principles informing the selection of the research paradigm, design, sampling techniques, instrumentation and data analysis was outlined. The following chapter reviews international and national literature on ECCE settings and the characteristics that shape early childhood settings globally and in Lesotho.

CHAPTER TWO: LITERATURE REVIEW

In the dynamic landscape of early childhood care and education, a journey into the territory of strength-based approaches embarks on the innovative intersection with mathematical play pedagogy grounded in the belief that every child possesses unique strengths waiting to be discovered (Unknown).

2.1 Introduction

A literature review is described as an academic work that summarises, critically examines and assesses sources to show that the author is knowledgeable about and comprehends research that has been conducted on a particular issue in the context of that topic (Institute for Academic Development, 2022). This chapter systematically reviews the present expertise relating to SBAs using mathematical play pedagogy in ECCE settings. There are seven sections in this chapter. These are the following: (1) introduction; (2) the role of play in ECE, (3) play pedagogy in Lesotho ECCE settings, (4) mathematical play pedagogy in Lesotho ECCE settings, (5) strength-based approaches in ECCE settings, (6) teachers' understanding and perceptions on mathematical play pedagogy, (7) situated practices supporting SBA in mathematical play pedagogy in ECCE settings, (8) how SBAs explain mathematical play pedagogy, and (9) a summary of the chapter. This chapter focuses on SBA and its implications for mathematical play pedagogy in Lesotho ECCE settings.

In the context of this study, I acknowledged a need for the use of SBA in Lesotho ECCE settings. With this in mind, I discussed the advantages and drawbacks of SBA, specifically in the Lesotho context, to address the research gap. There is limited research on play pedagogy and SBA, particularly in improving mathematical learning in Lesotho's early learning environments. Most of the literature comes from research conducted abroad. My research focuses on children in early learning classrooms (reception classes for five-year-olds) that are at the transitional exit point from pre-primary to primary education. As a result, several terms are used interchangeably because of their interconnectedness and multifaceted definitions in this literature review chapter. These include 1) pedagogy or teaching and learning; 2)

play pedagogy, playful learning, learning through play or play-based learning, and 3) ECCE settings or ECCE classrooms.

2.2 The Concept of Play in ECCE Settings

The ECCE settings have become more academically focused (Hesterman, 2018; Pyle & Danniels, 2017). The perceived value of play lessens as it has been replaced by sit-down academic teacher-directed lessons (Paterson, 2020:97). According to Pyle and Danniels (2017), the current standards have become heavily focused on teaching academic skills as early as possible to maximise children's future academic success regardless of the questions emerging from the educational and developmental benefits of play (Pyle & Danniels, 2017). This has resulted in an amplified focus on teacher-directed academic instruction (Hesterman, 2018 in Bubikova-Moan *et al.*, 2019), with children in ECCE settings taking on the role of passive recipients of knowledge (Pyle & Danniels, 2017). Subsequently, children's right to play (MoET, 2021) is violated and the time children spend at play in the ECCE settings has decreased (Pyle & Danniels, 2017).

Despite the widely acknowledged virtues of play, literature shows that a growing concern has been voiced regarding the alarming disappearance of play from the ECCE settings, which calls for safeguarding children's spontaneous and free play (Bubikova-Moan *et al.,* 2019). Henricks (2020) has also affirmed that two main concerns about play stem from the cognitive complexity and degree of different types of play and the kind of social interaction in which the child is involved while playing. Moreover, the implication that both cognitive and social child development could be considered as coexisting and overlapping scenarios exacerbate this. It can be concluded that different types of play and their complexity need to be unpacked in ECCE settings to understand children's cognitive and social development.

As a result, many researchers have debated how to define the concept of children's play, and there continues to be disagreement regarding what human actions are included in this activity, why children engage in it, and how it impacts learning and development (Pyle & Danniels, 2017; Vogt *et al.,* 2018). Given these scenarios, it is essential to define play, articulate its types, and outline its benefits in ECCE settings before discussing play pedagogy in Lesotho ECCE settings.

2.2.1 Defining play in ECCE settings

Play and playfulness are essential in ECE (Reikeras, 2020), although teachers are only sometimes aware of their role in fostering play (Vu, Han & Buell, 2015). MoET, 2021:20) define play as the ultimate manifestation of human growth throughout childhood since it is the only time the child's soul may freely express itself. According to Vogt *et al.* (2018), play has been defined as activities that are fun, voluntary, flexible, have no extrinsic goals, involve active engagement of the child, and often have an element of make-believe. Play is essential in the lives of young children, as it is vital for their wellbeing, development and learning (Atkinson, 2017; Caiels *et al.,* 2023) mainly because play is central to growth and is the laboratory where individuals exercise and refine their abilities to comprehend and manage the world.

However, depending on the researcher's speciality, there are several schools of thought about the nature of play from various angles, making the definition of play a contentious subject among scholars (Wu, 2023). Therapists, for instance, see play as a tool for assisting children in dealing with difficult issues in their daily lives (Wu, 2023). However, according to Vogt et al. (2018), playfulness is frequently linked to education as a means of assisting humans to learn, relate, and interact across generations, cultures, and contexts. Numerous academics disagree over what constitutes play, why children play, and how play affects learning and growth (Danniels & Pyle, 2018; Vogt *et al.,* 2018). As a result, it may be concluded that no one definition of play can satisfy the opinions and standards of scholars from various fields.

Nevertheless, the play has value (MoET, 2021). Heang *et al.* (2021) highlight the significance of play in the development of symbolic thinking and as a cornerstone of cognition. He further argues that play contains all the developmental tendencies (cognitive, physical, social and emotional) and thus creates a ZPD that pulls the child forward. For this reason, play activities are essential in the ECCE settings because play leads to development, giving rise to abstract thinking, self-awareness and self-regulation (Heang *et al.,* 2021). Most critically, play is meaningful, joyful, engaging, iterative, socially interactive and fun to those engaged in its practice (United Nations

International Children Emergency Fund [UNICEF], 2018), which may be why it is such an appealing activity for children.

2.2.2 Types of play in ECCE settings

According to Pyle and Danniels (2017), children's play has been described as freely chosen, actively engaging, opportunistic, pleasurable, creative and concerned more with means than ends. Heang *et al*. (2021) have described different types of play with objects, including functional, symbolic and games with rules and constructions. Pyle and Danniels (2017) add that the two different types of play that have dominated the focus of current education research are children's free/ child-led play (Reikeras, 2020) and adult-guided play (Weisberg & Zosh, 2018).

2.2.2.1 Functional play

Heang *et al. (*2021) have described functional play or practice play as the repetition of an act for pleasure or skill practice. Reikeras (2020) has shown that both sensorimotor and exploratory play are embedded in functional play. He further indicated that in this type of play, the child uses all the senses to test the function of toys and objects and it is a significant type in the first two years of a child's life (Hännikäinen & Munter, 2018). According to Henricks (2020), functional play refers to play activities in which children explore the possibilities of materials through physical manipulation. It is also called object play (Heang *et al.*, 2021).

McLord studied 36 children from ages three to five who played in groups of three with high-structured toys (for example, a tea set) or low-structured toys (for example, blocks). The findings revealed that independence and creative thoughts were enhanced in children (Heang *et al.,* 2021). Whitebread *et al. (*2017) note that observing children while they engage in object manipulation provides vital information about children's social, problem-solving and creative skills. Reikeras (2020) argues that children obtain valuable experience developing mathematical skills through experimentation with objects and toys. Therefore, I can also argue that functional play can be used to explore SBAs using mathematical play pedagogy in ECCE settings.

2.2.2.2 Symbolic play

Henricks (2020) believes that symbolic play is a form of make-believe play that involves the representation of absent objects. Symbolic play is also referred to as ‘make-believe’, ‘imaginative’ play, or pretend play (Heang *et al.,* 2021), ‘semiotic’ play (Whitebread *et al.,* 2017), and ‘thematic’ play (Heang *et al.,* 2021). According to Reikeras (2020), pretend play is the mature form commonly seen between three and six years of age where the child operates in the ZPD for learning and development (Vygotsky, 1978). He further indicates that at the age of three, the child has developed other skills in symbolisation; the toy car can now represent a telephone, and the ability to abstract and symbolise when mirrored in pretend play is a central skill in mathematics that provides rich opportunities for mathematical learning (Worthington & Van Oers, 2016).

Most importantly, pretend play enhanced the fluency of divergent thinking, which in turn translated to mathematical achievement, according to Wallace and Russ's (2015) study on the relationship between mathematical performance and symbolic representation in pretend play. The longitudinal study by Murtagh *et al.* (2022) showed that processes inherent in free play, such as symbolism, divergent thinking, effect, etc. can be transferred to academic skills. Therefore, future research should investigate whether incorporating free play into academic lessons like mathematics can lead to improvements in academic success.

More research is also needed on the relationship between cognitive development (such as in mathematics) and pretend play (Vogt *et al.,* 2018). Even so, studies have found that children engaging in more symbolic/act play have tremendous conversational success, emotional understanding and increased problem-solving, negotiation skills, moral reasoning and divergent thinking (Heang *et al.,* 2021; Whitebread *et al*., 2017). In line with the above discussion, it is reasonable to infer that symbolic play can enhance mathematical play pedagogy in ECCE settings.

2.2.2.3 Games

According to Henricks (2020), games include physical practice, imaginative or symbolic or pretend, and games with clearly identified rules. He claims that games

feature self-imposed restrictions that narrow the range of actions, set goals and facilitate social interaction. Researchers generally agree that games stimulate cognitive development and are of the most significant interest to children aged four years and older (Heang *et al*., 2021; Henricks, 2020; Lai *et al.,* 2018). Whitebread *et al. (*2017) postulate that in young children, a considerable proportion of the time and energy spent playing games is devoted to establishing, agreeing, modifying and reminding one another about the rules and inventing their own rules.

Heang *et al. (*2021) add that children develop or use rules to establish how the play is supposed to go on. Games with rules differ from pretend play in that the rules have been established in advance and determine how the play is going (Heang *et al*., 2021). The players must agree upon any alterations to the rules beforehand. Henricks (2020) highlights that by playing games with friends, siblings, and parents, it has been argued that young children are learning a range of social skills related to sharing, taking turns and understanding others' perspectives. Ramani *et al. (*2019) believe that rule-based games are an engaging way of working with mathematics with young children and can promote the learning of mathematics (Cohrssen & Niklas, 2019; Vogt *et al.,* 2018). Based on the above inferences, I can also argue that games can be used to facilitate mathematical play pedagogy in ECCE settings.

2.2.2.4 Free play/child-led play

Researchers suggest that to optimise early brain development children require free play (Weisberg *et al.*, 2016). Griswold (2018:13) defines free play as an unstructured or unrestricted play that has no rulebooks, no referees and no umpires. Pyle and Danniels (2017) add that free play is exclusively child-directed, voluntary, flexible and often involves pretend play, although it can also refer to other types of play. Studies that examine pretend play in children or play that consists of taking on different roles in acting situations, have associated it with free play (Holt *et al.,* 2015).

However, some researchers have pointed out that the concept of free play is vague since even spontaneous, child-led play is dependent on their previous experiences (Wallerstedt & Pramling, 2012), and children's interests tend to be introduced by adults rather than from innate tendencies (Brooker, 2011). Despite that, Griswold (2018) is of the view that when engaging in impulsive and unrestrained play, the

child's brain starts to form new circuits inside the prefrontal cortex to navigate and elaborate social interactions such as turn-taking which require both an understanding of order and self-regulation, both of which are related to mathematical skills. He further acknowledges that it is impossible to attain this through guided play, where early teachers impose rules and time when children play structured basketball or football games. Hence, for play to have the desired impact on brain development, as discussed, the play must be playful (Griswold, 2018).

2.2.2.5 Adult-guided play

According to Weisberg and Zosh (2018), guided play is a form of play in which the children's activities are scaffolded by a knowledgeable adult, allowing children's actions to lead them to the learning goal. It is also called teacher-organised or structured play (Reikares, 2020). Adding to this definition, Pyle and Danniels (2017) postulate that adult-guided play is described as lying somewhere between a formal lesson and unstructured play and involves adults in preparing and configuring the play environment but leaving control to the children within the environment (Weisberg *et al.* 2015).

Equally, in guided play, the activity can be either child-initiated or adult-initiated. Still, it is emphasised as a child-directed practice where, just as in free play, the locus of control is placed with the child, and this is the feature that free and guided play share (Weisberg & Zosh, 2018). Children direct their learning within the established play contexts and teachers enhance the learning experience by playing the role of commentators, co-players, questioners or demonstrators of new ways to interact with the materials involved (Fisher *et al.,* 2013; Weisberg *et al.*, 2013).

Similarly, Pyle *et al.* (2017) also note that guided play – both teacher-directed and mutually directed – has been found to best support children's general academic learning and contribute to their oral language, reading, writing, scientific, and mathematical skills. This is based on their review of 74 studies looking at the relationship between play and academic achievement.

Lastly, evidence (Reikeras, 2020; Weisberg & Zosh, 2018) shows that children engaged in guided play activities were likelier to learn a target piece of information

than those who engaged in free play. As a result, guided play is considered effective at allowing children to learn (Weisberg & Zosh, 2018) because, in teacher-organised play, the teacher sets the rules and initiates the play, enriching the play and thus scaffolds the children's learning to achieve specific educational goals (Reikeras, 2020) including mathematics or reading skills (Weisberg & Zosh, 2018).

2.2.3 Benefits of play in ECCE settings

Melissa (2017) believes that the benefits of play for children follow them into adulthood. Hence, it is essential to understand that children learn to become well-rounded individuals when they play. With this in mind, I believe that teachers must advocate the need for play for children in all early educational settings because it is undeniable that children find play enjoyable and beneficial (Weisberg & Zosh, 2018).

A study by Kavitha (2016) indicates that outdoor recreation is effective in helping children's social-emotional development. The findings reveal that outdoor play allows children to develop positive relationships with peers and practise their insufficient social skills (Binnawas, Khalifa & Bhaumik, 2019). In addition, as a researcher, I have observed that play gives children time and space to socialise with friends, gives a sense of freedom, enhances self-esteem, provides self-awareness, and improves and maintains their physical health as children throughout the game.

According to Heang *et al.* (2021), the importance of play in ECE is seen globally in young children's development and wellbeing. Play also promotes readiness and continued learning in young children by providing them with effective play-based ECE curricula and instructions (Heang *et al.,* 2021). Researchers support the importance of play during the early years in numerous areas of growth and development, including a) self-regulation, social competence and early academics (Heang *et al.,* 2021; Reikares, 2020; Griswold, 2018; Vogt *et al.,* 2018); and b) physical wellbeing and fitness (Whitebread *et al.,* 2017).

Similarly, advocates of play often claim that play contributes to the development of problem-solving capabilities, negotiation skills and critical and creative thinking in children (Heang, *et al.,* 2021 & Whitebread *et al.,* 2017) in such a way that children organise tasks, assign characters to assume the play roles, engage in problem-

solving behaviours such as fixing the broken toys, looking for props and materials to meet the play intent. A play-based curriculum is said to offer children opportunities to acquire positive attributes and dispositions that are considered essential for learning, such as planning and organisation, concentration, engagement, reflection, involvement and participation (Heang *et al.,* 2021) purposefully for children's holistic development (MoET, 2021).

More specifically, in the area of mathematics, the findings of a study conducted by Reikares (2020) on the relations between play skills and mathematical skills in toddlers affirmed that the mathematical areas exhibiting the highest correlation with both independence and interaction in play were shape and space, mathematical language, logical reasoning and pattern and order whereas, both pretend and exploring and construction play correlated with introducing mathematics to toddler groups.

On the other hand, Vogt *et al. (*2018), in their study on the effects of the mathematical competency of the two pedagogies (the teacher-led approach and the play-based approach), found higher learning gains overall for the play-based approach. Likewise, children learn informally about concepts such as more and less, taking away, shape, size, location, pattern and measurement through play (Heang *et al.,* 2021). The mathematical knowledge gained through everyday play activities seems to be a natural component of cognitive development, often without adult instruction (Alharthi *et al.,* 2019). Therefore, it is reasonable to infer that play lays the foundation for logical mathematical thinking and stimulates early mathematics in children's everyday experiences.

In summary, during children's engagement in play, their development moves along paths of increasing cognitive, social, emotional and physical complexity using signs and symbols, creating rules, changing roles and play scenarios, and controlling their behaviour and actions (Binnawas *et al*., 2019). Children's expression in play activities like scribbling, drawing, painting and sculpture is considered an essential part of ego formation because it encourages each child's emotions and creativity. Thus, the activities are critical in helping children with their ability to express themselves through play (Heang *et al.,* 2021). In line with the above discussions, I

believe play is highly significant and appropriate for teaching and learning in ECCE settings.

2.3 International Trends in Play Pedagogy

Lesotho, as a signatory to the SDGs, is striving for quality programming for young children through play-based learning, or playful learning, which is central to quality early childhood pedagogy and education (UNICEF, 2018:1). According to Danniels and Pyle (2018:1), there has been a shift towards play-based learning in early education curricula across several countries, including Canada, Sweden, China, United Arab Emirates and New Zealand, Lesotho is therefore no exception. Gasteiger, Brunner and Chen (2021) are of the view that learning in ECCE institutions tends to be informal and is often embedded in natural and play-based learning situations targeting adaptive learning support within a child's ZPD which is a crucial goal of ECE (Wullschleger *et al.,* 2022).

Play pedagogy has gained advocacy as a recommended curricular approach in several national ECCE contexts (Danniels & Pyle, 2018) because of an increased emphasis on the academic progress of younger children, which is now being implemented in many countries, including Lesotho, and requires ECCE teachers to be more prepared and to increase the monitoring and assessment of children's learning (DeLuca, Pyle & Lapointe-McEwan, 2020).

Hamilton and Wood (2020:4) define play pedagogy as a way of integrating children's play experiences with curricular learning, giving children the flexibility to find solutions to both new and existing problems. They further indicate that play pedagogy improves children's independent motivation to learn and encourages autonomy by engaging children in personally meaningful activities that enable them to learn about themselves and others. Similarly, Vogt *et al. (*2018) define play-based learning as a teaching pedagogy involving playful, child-directed elements with adult guidance and scaffolded learning objectives.

Evidence suggests that this type of learning tends to be more effective than direct instruction (Pyle & Danniels, 2017) or free play (Honomichl & Chen, 2012). By contrast, while play and play-based learning approaches are routinely integrated into

early education curricula for children in preschool settings (Nicholson, 2019), the perceived value of play lessens as children get older, with fun and motivating play-based approaches being replaced by sit-down academic teacher-directed lessons (Paterson, 2020:97). However, Harris and Petersen (2019) maintain that play-based learning practices positively influence children's early mathematics skills, perhaps the strongest predictor of later success in both reading and math.

2.4 Relevance of Play Pedagogy to Lesotho's Context

In the context of Lesotho, the MoET has developed the new ECCD Curriculum Guide 2021, which has adopted an integrated play-based approach (Maraisane, 2022). The Lesotho ECCD Curriculum Guide 2021 is categorised according to three age groups: a) zero to two, b) three to four, and c) five-year-olds. The curriculum is grounded in a play-based learning approach (MoET, 2021:4) which is defined as an approach that provides opportunities for children to explore, investigate and test ideas through free play, guided play, directed instruction and games using a variety of stimulating materials and activities offered in a well-prepared environment.

The Curriculum Guide further advocates a balance of child-adult involvement in play pedagogy and free play, guided play, games and direct instruction which should be interwoven throughout the programme's daily schedule, routines, environment and learning experiences (MoET, 2021:25). Most significantly, Maraisane (2022:6) proposes that it is hoped that through the engagement of different types of play activities in ECCE settings, children exercise their full potential and therefore develop holistically.

In line with MoET (2021), the play-based syllabus was developed for three to four and five-year-olds, to provide teachers with high-quality instructional materials to ensure consistent and coherent play instruction (Maraisane, 2022). According to Woods, Luke, and Weir (2010 in Maraisane, 2022), a syllabus is an official map or summary with specifications of preferred and expected content to be taught and

learnt. It is worth noting that the development of the syllabus was also informed by the document called Early Learning and Development Standards ([ELDS] MoET, 2019). The ELDS is a validated content of what a *Mosotho*[2] the child knows and can do at a particular age of his/her development (MoET, 2019). The standards are accompanied by specific and measurable indicators to measure children's developmental progress and to further provide guidance to teachers and parents about the competencies young children need to accomplish at their age of development (Maraisane, 2022). As a result, it can be concluded that the activities in the syllabus are not only play-based but are also relevant and age-appropriate to each level of child in the Lesotho ECCE settings.

To ensure access to quality ECD, care and pre-primary education by 2030 (United Nations, 2020:1), Lesotho is among the six countries (Malawi, South Africa, Zimbabwe, Zambia and Namibia) implementing the School Readiness Initiative funded by the Roger Federer Foundation (RFF). The initiative is mainly for transitional assessment of children from pre-primary to primary education. According to RFF Strategy (2019-2025), the assessment results revealed common gaps in the six countries. The gaps include poor tracking of the development of children for school readiness during the reception year, poor quality of play pedagogy in ECCE classrooms and poor indoor and outdoor environments in ECCE settings.

In this regard, Lesotho is currently implementing: a) continuous assessment digitally in ECCE settings in the form of an application called ***'child-steps'*** to improve the poor tracking of the development of children for school readiness during the reception year, b) teacher training course through an application called ***'know-how'*** to provide modules with play pedagogy to improve the quality of play pedagogy in ECCE classrooms, and c) improvement of the outdoor environment through the ***'natural playgrounds'*** application. More specifically, the assessment activities and teacher modules are tailored to accommodate play pedagogy as advocated by the

[2] Mosotho (singular noun) referring to a person who is a citizen of Lesotho by birth.

curriculum (MoET, 2021). Based on this development it can be concluded that play pedagogy is used in Lesotho ECCE settings.

According to Baroody, Clements and Sarama (2019) structured play, learning trajectories, and integrated instruction can be helpful pedagogical tools in providing structured play experiences that ensure educative experiences and developmentally appropriate instruction. Baroody *et al.,* (2019) defines educative experiences as the activities leading to practical learning or forming a basis for later education, such as developmentally appropriate activities in which external factors – including the instructional content and practices – net with internal factors (child's developmental readiness and interest).

More so, structured play involves games chosen carefully with a young child's interests, needs and developmental level in mind. It can be a developmentally appropriate means (enjoyable, educative and challenging but achievable) of achieving research-based academic goals (Baroody *et al.,* 2019:7). Learning trajectories consist of theoretical and empirically-based developmental levels or steps. The steps are meant to define the goals for meaningful instruction. To identify children's current developmental levels, their subsequent instructional steps help them achieve the next level (Clements & Sarama, 2014), regardless of the context and teaching strategy (Baroody *et al.,* 2019). Lastly, integrated instruction is a strategic academic approach compatible with developing social and behavioural skills.

Finally, Lesotho adopted an integrated instruction approach in ECCE settings, aligning with the ECCD Curriculum Guide 2021 (Maraisane, 2022). Phosisi (2019) noted that no literature specifies the form of an integrated play-based approach that Lesotho has adopted. However, Phosisi (2019) notes that based on the literature on the general forms of integrated instruction, one may conclude that Lesotho has adapted to the interdisciplinary form. According to Phosisi (2019), the interdisciplinary form has common learning areas across disciplines. The interdisciplinary approach involves significant fields such as English, Mathematics and Science.

These areas are organised so that children can use overlapping skills to discover commonalities within the unit concepts (Phosisi, 2019). Similarly, Maraisane (2022) acknowledges that the Lesotho ECCD syllabus comprises three learning areas: literacy (Sesotho and English), numeracy and life skills. The learning areas are grouped under six developmental domains (approaches to learning, investigation and discovery, health and wellbeing, language and communication, social relations and spirituality, beliefs and morality) of the ECCD curriculum. The grouping is also influenced by the fact that the MoET (2009) shows that traditional subjects have been grouped into areas of learning, focusing on connections between them. An integrated conceptual lesson plan used in Lesotho ECCE settings to implement the integrated approach across three learning areas of the teaching syllabus is attached (see Appendix G).

2.5 Impact of Play Pedagogy on Early Childhood Mathematics

According to Reikeras (2020:703), play is central to children's learning and development in the early years, including mathematics learning. Lesotho ECCE mathematics requires a distinctive and child-friendly approach, like play pedagogy. The mastery of early mathematical learning in early childhood is a principle that assists children in understanding the concepts of higher mathematics and is accomplished by direct experience in an environment cultivating children's interest in learning mathematics (Rusdawati, 2020).

According to Gripton and Williams (2023), play pedagogy is fundamental to good mathematics teaching and learning in ECE and assumes varying degrees of emphasis depending on the child's age. The above scholars further indicate that it is impossible to think about good mathematics pedagogy for children without acknowledging that early mathematical learning occurs in the context of children's play (Gripton & Williams, 2023). Askew and Venkat (2020) assert that mathematical play-based learning improves children's logical thinking skills, problem-solving and procedural knowledge of addition, subtraction, multiplication and division.

Studies have also shown that specific characteristics are associated with mathematics education in ECCE settings (Askew & Venkat, 2020; Lebihan & Takongmo, 2018; Beke, 2017; Feza, 2016). For instance, Beke (2017:187) asserts

that through mathematics education, children begin to know the world around them and realise it through concrete actions, interaction with others and problem-solving. Similarly, Lebihan and Takongmo (2018:2) postulate that mathematics education in early childhood has better long-term positive effects on future academic success and access to the labour market for children at a later stage.

Most recently, Askew and Venkat (2020:2) claim that one of the attributes of mathematics education is the provision of fluency skills to children in early counting and the development and appreciation of numeracy skills in other mathematical aspects. Lastly, researchers (Bubikova-Moan *et al.,* 2019; Reikeras, 2020; Vogt *et al.,* 2018) believe that the approach to learning mathematics in ECCE settings should be based on the principles of integration and play-based learning. This suggests that through mediation and scaffolding, teachers in ECCE settings need to enhance the characteristics they lack (Feza, 2016:484).

In reality, many studies carried out in this field have concentrated on the following: challenges (deficit-based approach) faced by teachers in choosing between giving children time to play independently or using direct instruction to convey academic material (Paterson, 2020), teachers figure out some disagreements between required standards and recommended teaching methods (Pyle & Danniels, 2017), environmental crises (Solare-Rojas *et al.,* 2022), educational resources (Diale & Sewagegn, 2021; Solis & Isoda, 2022), pedagogical skills (Haile & Mohammed, 2017), mathematical competencies (Vogt *et al.,* 2018), inappropriate curriculum (Akinrotimi & Olowe, 2016), conducive working conditions (Diale & Sewagegn, 2021), teachers' beliefs and practices (Bubikova-Moan *et al.,* 2019), absence of indoor and outdoor equipment for mathematical play (Ntumi, 2016), lack of adequate training centres for teachers to improve their qualifications (Feza, 2016), lack of a unified vision (Ebrahim, 2014), and the teacher/child ratio (Jensen *et al.,* 2019). Because of this, scholars have started to accentuate the need to shift studies from deficit-based approaches to SBA through play pedagogy in ECCE settings (Caiels *et al.,* 2023; Fenton *et al.*, 2016).

Although the literature points out that mathematical play has been a primary focus of ECE research studies (Reikeras, 2020 & Vogt *et al.,* 2018), this is not the case in Lesotho. More research in Lesotho is needed on SBAs using mathematical play pedagogy in ECCE settings. My experience as an ECCD inspector has shown me that play is a key component of high-quality mathematics instruction and learning and expands young children's learning chances. Furthermore, my observation has also taught me that ECCD teachers in Lesotho still struggle to devise innovative approaches to early mathematics that are compatible with early childhood pedagogy, to grasp mathematical play programmes children must be exposed to and conceptualise ECCE settings. In light of this, I might further contend that Lesotho has a long way to go to improve and attain quality mathematical play pedagogy in ECCE settings.

With this in mind, and as a researcher, I considered the significance of exploring mathematical play pedagogy as 'positive psychology' (SBAs) in Lesotho ECCE settings because the study of play has a long history in both psychology and teaching (Henricks, 2020). Furthermore, an interest in how SBA and children's learning may be influenced by positive education and wellbeing is escalating mainly because a new educational approach known as positive education closely links children's wellbeing to academic success (Galloway *et al.*, 2020:31). One path emerging from this application of positive psychology concepts to education is a new philosophy and most crucially, incorporation and enactment of SBA (Galloway *et al.*, 2020).

Lastly and most importantly, MacDonald (2018:144), in his competency cycle process (a process of creating positive expectations and opening the way for the development of new competencies) argues that applying a strong strength strategy points out the abilities and skills of children in mathematics, as well as the chances and tools available to support their growth to achieve the specified learning objectives. This corroborates Caiels *et al.*'s (2023:2) idea that strength-based techniques are grounded in a philosophical perspective that prioritises addressing human potential over human shortcomings. In the next section, I articulate ECCE teacher's understanding and perceptions towards mathematical play pedagogy.

2.6 Teachers' Understanding and Perceptions in Mathematical Play Pedagogy

According to MacDonald *et al.* (2021:89), teachers in ECCE settings adapt their lesson plans to the play behaviours of their children to maximise their mathematical abilities. For instance, children are frequently taught to count through activities such as counting the number of times a ball bounces or the amount of time before a leap. The play incorporates notions of measurement: huge and little in ball kicking, rapid and slow in cycling, and tall and taller in measuring each other's heights and volumes in cooking.

Furthermore, mathematical play is reasonably noisy, messy and fun and is exciting work for young children that inspires growth and intellectual development in language, literacy, logic, and mathematics in the ECCE settings (Trundle & Smith, 2017:81). For enhancing these skills in children, teachers create opportunities for children to explore and practise mathematical play, as children spend a long time in the ECCE settings, which becomes a social environment where learning takes place (Sotuku, Okeke & Mathwasa, 2016).

However, Helmbold (2014:3) acknowledges that these opportunities are rarely provided to young children as teachers often neglect them and offer only what feels more comfortable in the ECCE settings. Therefore, teachers must employ different types of play, including child-directed, mutually directed and teacher-directed (Pyle & Danniels, 2017:274), to facilitate the teaching and learning of mathematics in ECCE settings. This idea resonates with Breathnach *et al.* (2017:5) and Bubikova-Moan *et al.* (2019:778), who affirm that teachers' attitudes, beliefs and experiences play a substantial role in adopting play as a pedagogical tool in engaging children in mathematical play.

Teachers, therefore, should be conscious of their role in promoting play, because it is widely accepted as a crucial learning path in ECCE settings (Vogt *et al.,* 2018), particularly in mathematics (Vu, Han & Buell, 2015:443). Teachers emphasise that play should be the foundation of early learning (Gripton & Williams, 2023) and that mathematical activities should be integrated into everyday circumstances (ECMG, 2022). Hence, teachers in ECCE settings are urged to employ SBAs to preserve

what works best for the child and validate how it works so that it may be sustained and modified to fit the children's ability to support play.

However, the literature indicates that the meaning of the SBAs and how it can be actualised in early childhood settings has not been well articulated, understood or questioned (Fenton *et al.*, 2016). Moreover, the evidence suggests that relatively little is known about SBAs (Caiels *et al.,* 2023). As a result, the following sections define SBA in ECCE settings, discuss the practices that support SBA and finally, link the SBA practices to mathematical play pedagogy in ECCE settings.

2.7 Defining SBAs in ECCE Settings

According to MacDonald *et al.* (2021), the SBA originated in the field of social work practice and psychology in the 1980s and 1990s (McCashen, 2017) and is gaining recognition within other human services sectors, including healthcare and education (Pulla, 2017). This is especially true in ECE (Fenton *et al.,* 2016) where it is seen as an alternative to the conventional approach that was deficit-based and concentrated on individual pathology (Swartz *et al.*, 2016). Fenton *et al.* (2016:29) maintain a growing global enthusiasm and conviction that professionals dealing with young children should embrace SBAs to encourage all children's and families' access to and involvement in activities, including those with challenging needs. The United Kingdom Department of Health and Social Care (UKDHSC, 2019:30) view SBAs as a paradigm of social work practices that highlights individuals' strengths and capacity for self-determination. It recommends a collaborative and solutions-based approach to assisting individuals to bring about change and perceives clients as resourceful and resilient amid difficulty.

Hence, SBAs are defined as the methods of teaching that acknowledge and build upon the abilities of the children (MacDonald *et al*., 2021:83). A similar definition is provided by Galloway *et al.* (2020), who acknowledge that SBA is the collective procedures that help children identify and capitalise on their talents. In a similar vein, according to Caiels *et al*. (2023), strengths are children's intellectual, physical and interpersonal skills, capabilities, dispositions, interests and motivations that support their talents in a variety of activities, thought processes and character qualities (Galloway *et al.*, 2020).

The Australian early learning framework also states that teachers must recognise children's strengths and interests by engaging children in learning actively (AGDE, 2022:9). This framework elaborates by saying that early childhood teachers who are devoted to equality believe that all children can flourish despite their unique backgrounds and skills. In a nutshell, the educational processes that embrace children's strengths to improve children's learning, development and wellbeing (AGDE, 2022) are known in the literature as SBA (Caiels *et al.,* 2023; Galloway *et al.,* 2020). Professionals in ECCE settings – including teachers – are encouraged to use SBAs that focus on what suits the child and how it functions to enhance and maintain the child's capacity to support play pedagogy (MacDonald *et al.,* 2021).

Equally, according to Galloway *et al.* (2020), children's academic achievement depends on their ability to develop their talents. A similar view is postulated by Swartz *et al.* (2016:2), who argue that in SBAs, for children to succeed and be prepared for school, parents' support and commitment are essential in ECCE classrooms. These scholars further indicate that positive relationships among children, teachers and families based on trust, respect and collaboration are vital for successful SBAs in ECE programmes. The UKDHSC (2019) adds that the practitioners of SBAs think that children and their families are resilient and possess the qualities necessary to overcome hardship. They also think this paradigm substitutes and stresses issues, weaknesses, and deficiencies because it makes it possible to perceive possibilities, empowerment and solutions rather than negative issues and hopelessness. Most significantly, it uncovers and highlights a young child's inner assets and talents when they surface in reaction to overcoming obstacles (Swartz *et al.,* 2016).

While SBA is being encouraged in early learning settings (MacDonald *et al.,* 2021), criticism of this approach has been levelled at many aspects, including redefining shortfalls by downplaying or denying actual issues (MacDonald *et al.,* 2021), being too superficial and insincere (MacDonald *et al.,* 2021) and for being a theology based on ideologies (Epstein, 2012). Furthermore, according to MacDonald *et al. (*2021), SBA is developmental and process-oriented, so practitioners need to be cautioned about how difficult it may be to identify and use one's skills and be advised that the process might take a long time (Ahuja *et al.,* 2022; Bainbridge & Lunt, 2021;

Daly & Westwood, 2018). Lastly, if teaching methods are restricted to identifying and praising strengths without providing support and opportunities for developing new abilities there is a significant risk that teachers and students may acquire inflexible mindsets or rigidity (MacDonald *et al.,* 2021:85).

Nonetheless, in settings related to education, SBA presents an alternative viewpoint that contrasts with a deficit view of learning (Fenton, 2013). MacDonald (2018) warned that taking a deficit perspective on a child's mathematical ability can set off a never-ending cycle of low expectations. This can prevent chances for mathematical learning, exacerbate unpleasant mathematical learning experiences and eventually lead to disempowerment and poor performance that restrict the increase in the number of children pursuing mathematics in higher education. This goes against the view of the ECMG (2022) who suggest that every child should have the chance to participate in and gain from mathematical education. Hence, SBAs in ECE have roots in early intervention (Swartz *et al.,* 2016) based on an individual's capacity, competencies and self-determination (Caiels *et al.,* 2023). In line with the above discussion, I now outline the practices supporting SBA and situate them in ECCE mathematical play pedagogy.

2.8 Outlining the Practices Supporting SBA in ECCE Settings

Literature indicates that the practices supporting SBA include assessment for learning and growth, equality and diversity, reflective practice, and integrated teaching and learning approaches (Caiels *et al.,* 2023; DEECD, 2012; Swartz *et al.,* 2016; Victoria Department of Education and Early Childhood Development [VDEECD], 2016) and inclusion of families (Swartz *et al.,* 2016; VDEECD, 2016).

2.8.1 Integrated teaching and learning approaches

According to Swartz *et al.* (2016; DEECD, 2012), an integrated teaching and learning approach is one of the practices supporting SBA in ECCE settings. The DEECD (2012) define a method of teaching and learning that is integrated using Sustained Shared Thinking as recommended by the Victorian Early Years Learning and Development Framework (VDEECD, 2016) in which teachers and children

collectively collaborate intellectually to resolve an issue, make sense of a notion, assess a task or build a story to achieve instructional objectives through play.

The DEECD (2012) explains that playful learning is a lively process that encompasses children's involvement, stimulates children's thinking and incorporates a broad spectrum of cognitive, motor, social and artistic skills to support children's zones of proximal and potential development. As a result, children's learning is extended and supported when adults actively participate in and are sensitive to their play because active engagement with children offers not only the chance for quick learning but also continuous evaluation that results in insightful and thorough remarks (DEECD, 2012) that are also associated with children's holistic development (Maraisane, 2022). In light of this deduction, I believe that when teachers use an integrated teaching and learning approach, they interact consistently with the sustained shared thinking recommended by the (VDEECD, 2016) (see Figure 2.1 below).

Figure 2.1: Integrated teaching and learning approaches (VDEECD, 2016:12)

The sustained shared thinking in the VEYLD advocated combining recreation and education guided by children, supervised learning and play and adult-directed education in early learning environments owing to their effectiveness in advancing children's knowledge. The framework extended this further by justifying that learning takes place in a variety of social environments, for instance, when children engage in routines and daily activities, observe others and converse with others (VDEECD, 2016:14). It is especially the participation of receptive adults that can extend and encourage this learning in an interweaving way (see Figure 2.1).

Similarly, *adult-led learning* covers play sessions and other opportunities carefully thought out and scheduled by an adult based on the children's understanding. *Child-directed play and learning* is an exploration process in which children take charge of their education by letting their imaginations run wild, trying new things, looking into topics and using their creativity in ways they can manage. An adult's role is to watch children and gauge their knowledge and comprehension by seeing what they build, write, draw, say and do. Lastly, when adults participate in their children's play and learning they follow their interests and seize impromptu learning opportunities. This is known as *directed play and learning* (VDEECD, 2016).

Integrated teaching and learning approaches effectively support teachers in setting high standards for children by providing them with engaging and stimulating learning experiences (Victoria Education and Training, 2018). The (VDEECD, 2016) has a similar view which highlights that to support the achievement of identified instructional objectives, integrated teaching and learning approaches create environments that provide children with socially mediated learning opportunities with a variety of adults and peers. They also use intentional teaching strategies that are always decisive and can be either pre-planned or spontaneous. Finally, they teach children explicit subject matter, such as mathematics, literature, music, science, art and related skills, to help them expand and deepen their knowledge, understanding and values. MacDonald *et al.* (2021:89) show that teachers in ECCE learning environments respond to using play to uncover children's strengths and abilities including them in mathematical tasks. Children are frequently taught to count through activities such as counting the number of times a ball bounces or the amount of time before a leap. The play incorporates notions of measurement: huge and little in ball kicking, rapid and slow in cycling, tall and taller in measuring each other's heights, and volumes in cooking.

2.8.2 Reflective practices

The DEECD (2012:8) defines reflective practice as an ongoing process in which teachers consider their professional practices and ideals and how these affect a child's learning and development. The (VDEECD, 2016) further acknowledges that reflection and critical evaluation practices are central to early childhood

professionals' work because preserving a culture of learning in service and setting achievable goals or networking are associated with ongoing development. This idea also resonates with Swart and Bartlett (2016) who encourage teachers to use the professional development paperwork that allows teachers to exchange and discuss their work with each other in ECCE settings.

Moreover, professional reflection in early childhood strengthens the decisions made about what is important for children and families in their communities by working in collaboration with families, kinship members, children and other professionals to question, analyse, act upon and reflect on the evidence gathered and documented (VDEECD, 2016). A similar opinion is held by MacDonald *et al.* (2021:85) who claim that the strength approach is a practice framework that includes preparation, activity, review, learning and reflection. Figure 2.2 below shows how reflection occurs in ECE using the Early Years Planning Cycle (EYPC).

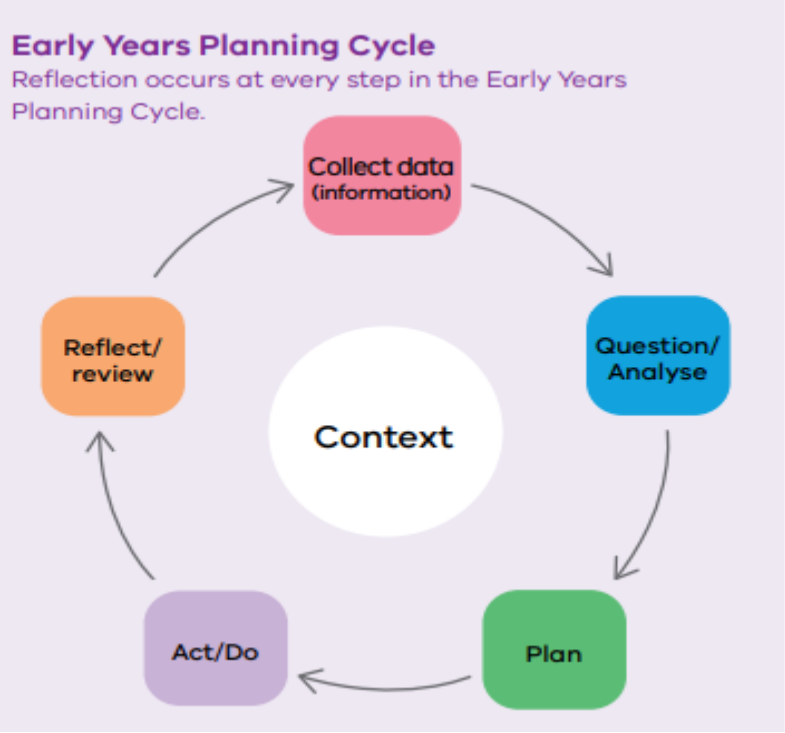

Figure 2.2: EYPC adapted from (VDEECD, 2016: 8)

According to the (VDEECD, 2016), using the EYPC for reflection increases early childhood professionals' awareness of inequalities and supports them in upholding all children's rights to succeed. Therefore, this procedure may authenticate the

prevailing practices, criticise ineffective ones, push for improvements, form the basis for helping individuals and teams to identify the following areas of improvement in ECCE settings and eventually develop benefits of experience and abilities that may be used, transferred, or expanded to enhance other situations.

Importantly, working in this way in ECCE settings abandons the deficit model of instruction, which places all of the emphasis on the issues and the abilities of children, and instead assists teachers in considering their goals and the methods that have worked well for them in the past. In line with the above argument, reflective practices permit teachers to gain insight into the child's personality, strengths, desires and priorities by getting to the core of the matter (UKDHSC, 2019)**.** The reflective practices also allow teachers to obtain a critical awareness of their work and consistently acquire the abilities, know-how, and strategies required to provide the best results for children while also supporting them by giving them genuine chances to share their ideas and actions influencing what happens in their lives (DEECD, 2012)**.**

2.8.3 Equity and diversity

According to UKDHSC (2019), equity and diversity are the enablers of SBA requiring a culture shift for a person, professionals, groups, companies and communities. Other scholars (Swart *et al.,* 2016) equate equity and diversity with cultural sensitivity. It encompasses more than abilities, information, attitudes, beliefs, duties and responsibilities. Nonetheless, all of these align with the primary features of SBAs, attesting to their viability (UKDHSC, 2019; VDEECD, 2016). Building on the above definitions, the Australian Children's Education and Care Quality Authority (ACECQA, 2019:17) also maintain that each child's current knowledge, ideas, culture, abilities and interests are foundational to each programme.

In addition, the VDEECD (2012; 2016) argues that their familial and cultural history shapes children's learning and development because they learn best when teachers appreciate their uniqueness and provide them with the best opportunities, experiences and support. Therefore, it can be concluded that teachers need to maximise possibilities for every child and identify areas where targeted assistance or intervention is required to advance children's learning and development; this would

help to ensure that the interests, skills and cultures of each child and their family are appreciated, cherished and respected.

Equity and diversity are significant to early childhood professionals (VDEECD, 2016) because they: promote cultural awareness in all children; ensure that all children have equal access to resources and opportunities to demonstrate their learning from birth, regardless of their circumstances or abilities; support all children in developing a sense of place, identity, and connection to the land and the natural world; and demonstrate a commitment to equity by abstaining from actions that directly or indirectly contribute to gender inequality, prejudice, and discrimination.

A similar view is evident in the ADGE (2022), which claims that early childhood teachers dedicated to equity believe in the potential for success of every child, despite their unique circumstances and skills. MacDonald *et al.* (2021:92) develop a strength-based strategy that uses cultural resources as a mediator and motivational objects of action to enhance young children's early mathematical instruction. Culturally distinct meanings in instruments contribute to their mediating function. For example, most people link buttons with clothes. However, in the formative years of schooling a box of buttons also has a contextually specific value since it provides a chance to teach higher-order ideas like subitising and categorisation.

Lastly, the National Council of Teachers' English Early Childhood Education Assembly (NCTE, 2016) expand on this thinking by acknowledging that underpinning equity and diversity practice is the conviction that every child is a capable, competent person with special abilities, strengths and gifts. Therefore, it is important to acknowledge that children's home languages and cultures play a vital role in their development before and throughout their learning time in school. Early childhood teachers must encourage children to keep their first language while acquiring other languages, particularly mathematical language, and view bi- and multilingualism as strengths.

2.8.4 Assessment for learning and development

According to (VDEECD, 2016), assessing children's talents, knowledge and understanding plays a significant role in developing and facilitating new learning and

growth in ECCE settings. It ascertains what knowledge and understanding children possess based on how children move and control themselves, what they manufacture, write, draw, say and do and what their families and specialists see about them. Maraisane (2022) affirms that it is undeniable that all children gain when an assessment takes a whole-child perspective, revealing each child's strengths, health and wellbeing and outlining the next learning steps. The VDEECD (2016), when expanding this further, indicates that early childhood professionals need to be thoughtful, deliberate and purposeful in selecting assessment tools and methods that produce a comprehensive picture of every child's abilities, knowledge and understanding.

The DEECD (2012), commenting on assessment for learning and development in early learning environments, states that it occurs repetitively in various contexts using different techniques that best reflect the development of children's understanding to offer an extensive view of the child. Furthermore, as much as it entails processes, teachers and families need to determine children’s readiness and preparedness to learn and perhaps ways to assist them (VDEECD, 2016). Similarly, the DEECD (2012) maintains that continuous assessment processes comprise a series of techniques that record and authenticate the many paths that children take to reach the expected goals. Such assessment methods shift from the outcomes of children's learning to considering the developmental milestones attained by every child individually and welcome and value not just the enormous learning leaps children make but also the tiny ones (DEECD, 2012).

Documentation supports the assessment for learning (DEECD, 2012). Swart *et al. (*2016) recommend implementing the Reggio Emilia and High-Scope approach which seeks to enhance children's distinct passions, abilities and capabilities and encourage teachers to use documentation to establish a connection with families and highlight children's advancement in ECCE settings. In their expansion of this idea, Reggio Emilia and High-Scope’s approach includes methods for recording, comprehending and evaluating children's needs and skills including portfolios of written or artistic work, films, images, notes and stories as well as more formal evaluations (Swart *et al.*, 2016).

A similar view is postulated by NCTE's Early Childhood Education Assembly (2016), which suggests that early childhood teachers should not use a deficit-based approach when describing a child. Instead, it is essential to recognise that any assessment report by DEECD (2012) also affirms that appropriate documentation is used to comprehend a child's learning preferences, learning styles, competencies, and capacities to facilitate the child's transition to school and the education and care programme. Therefore, assessment is employed in a way that optimises the child's learning and considers an approach involving the reliable sharing of documented information or evidence between families and early childhood providers (NCTE, 2016).

Finally, the EYPC **(**see Figure 2.2, Section 2.6.2) describes early childhood professionals' steps of gathering, examining, organising, acting upon and considering evidence of learning and development, including assessment, while collaborating with families and other professionals (VDEECD, 2016). Because early childhood professionals assess children in ways that include information from a wide range of sources to help them evaluate and plan effectively, planning and decisions are informed by interrogation and analysis. The process also reveals each child's specific strengths and capabilities and any achievement gaps that may benefit from additional early intervention. In this way, what is planned has meaning and adds to what children know and do (VDEECD, 2016).

2.8.5 Inclusion of families

Swart *et al. (*2016) explain that ECE programmes implementing strength-based education practices use Head Start (HS) programmes to support low-income children and families. These scholars further highlight that HS programmes advocate including families from diverse backgrounds and use parental engagement and support critical to children's development and school preparedness. This resonates with parent empowerment theories, which see parents as partners and experts on their children (Swart *et al.,* 2016). The (VDEECD, 2016) similarly affirms that inclusion is the proactive approach taken by early childhood teachers to gain insight into each child's family experiences and capabilities. Therefore, it is significant to consider and foster each child's sense of identity within their family, community and

early childhood environments; families and early childhood teachers who treat young children with respect and responsiveness in daily routines and experiences help them become more self-assured and empowered.

Lastly, including families as a practice in SBA encourages families to identify their children's strengths, thus altering how they see their children (Swart *et al.,* 2016). Swart *et al.* (2016) expand on this thinking by acknowledging this as a change in viewpoint that has consequences for ways that families encourage, guide and care for their children. Hence early childhood professionals and schools employing SBA need to uphold parents' abilities, sense of fulfilment and general wellbeing as the elements that facilitate favourable parent-child interactions, parents' ability to settle disputes within the family, and parents' function as their children's first teachers and decision-makers in their education (Swart *et al.,* 2016).

2.9 How SBAs Explain Mathematical Play Pedagogy

As said by MacDonald *et al.* (2021), SBAs explain mathematical play pedagogy as teaching strategies structured to support and enhance children's natural strengths, interests, and developmental trajectories, all while fostering an environment conducive to mathematical exploration and understanding. MacDonald *et al.* (2021) further contended that SBAs transform the way mathematics is taught and learnt in early childhood settings when applied to mathematical play pedagogy.

According to MacDonald (2018), SBAs encourage teachers to create opportunities that capitalise on children's natural curiosity, interests, and prior knowledge**.** For example, if a child shows a strong interest in construction or building, a teacher can incorporate mathematical play opportunities around this interest by encouraging the child to explore concepts such as geometry, symmetry, measurement, or spatial relationships through block play or other building activities. By tailoring the mathematical content to the child's strengths and interests (MacDonald, 2018), SBAs ensure that mathematical play feels engaging, relevant, and accessible to every child, promoting deeper engagement with the mathematical concepts being explored (Ramani *et al.,* 2019).

In addition, SBAs in mathematical play pedagogy emphasise play-based, hands-on learning (MacDonald, 2018)**.** For example, during free play with manipulatives such as counting blocks or pattern tiles, children are encouraged to explore these materials in open-ended ways, making their own discoveries. Teachers act as facilitators, offering gentle guidance and opportunities for reflection but allowing children to take the lead in their learning. In this way, SBAs encourage a child-centred approach where mathematical play is seen not as a prescribed set of tasks but as an open-ended process of inquiry and discovery (Reikeras, 2022; Vogt *et at.,* 2018).

Similarly, SBAs stress the importance of inclusivity and equity, ensuring that all children**,** regardless of their background, abilities, or prior experiences, have access to meaningful learning experiences (VDEECD, 2016). Gripton and Williams (2023) highlighted that in mathematical play pedagogy, this means adapting materials and teaching strategies to ensure that mathematical concepts are accessible to everyone. For example, if a child has limited fine motor skills, a teacher might provide larger, tactile manipulatives for counting or sorting, or use textured materials that engage the child's senses in the process. This inclusive approach is a key aspect of SBAs in mathematical play, ensuring that all children have the support and opportunity to succeed in mathematical exploration regardless of their individual challenges or backgrounds.

Furthermore, SBAs encourage teachers to regularly reflect on their practices and be responsive to the needs of individual children (Swart & Bartlett, 2016). This reflective approach is essential in mathematical play pedagogy because it helps teachers adapt their teaching strategies based on their observations of how children engage with mathematical content. For example, after observing how children engage with a patterning activity, a teacher might reflect on whether the activity is appropriately challenging for the children involved. Reflective practices ensure that the teacher can continuously tailor mathematical play experiences to better meet children's developmental needs (MoET, 2020).

More so, SBAs often emphasise collaborative learning (Evan, 2021)**,** where children are encouraged to work together and share their thinking. This is particularly important in mathematical play, as many mathematical concepts are best understood in social contexts where children can discuss their ideas, problem-solve together, and build shared understanding (Beke, 2017). In a play-based environment, children may engage in mathematical play alongside their peers – comparing number sets, working together to build shapes, or collaborating on measurement tasks. This collaborative aspect of mathematical play promotes deeper understanding as children challenge and support each other's thinking.

Moreover, VDEECD (2016) maintained that SBAs view assessment as an ongoing process of observing and responding to children's learning rather than evaluating or testing them. According to ECMG (2022), in mathematical play pedagogy, assessment is closely tied to formative assessment practices, where teachers observe children's engagement in play and use this information to adjust and enhance future learning opportunities. For example, a teacher might observe how a child uses spatial reasoning while building with blocks or how they discuss the concept of more or less during a sorting game. The teacher might then use this observation to inform future planning, offering activities that extend the child's thinking or scaffold a new concept. This type of assessment for learning aligns with the principles of SBAs by focusing on supporting children's individual progress rather than judging them based on predetermined standards (DeLuca *et al.,* 2020).

Finally, SBAs emphasise the importance of creating an environment where children feel safe, valued, and respected (VDEECD, 2016). In mathematical play pedagogy, this means creating environments that invite exploration (Rusdawati 2020), provide materials that encourage problem-solving**,** and offer opportunities for self-directed learning (Beke, 2017). For instance, a classroom rich in mathematical play might include materials like blocks, pattern tiles, measuring tools, and puzzles, all of which children can access freely to explore and experiment with. The environment is designed not just to teach mathematical facts but to foster a culture of inquiry, where children can take risks, make mistakes, and learn through trial and error in a supportive atmosphere.

2.10 How TLMs Facilitate Mathematical Play Pedagogy Using SBAs

Teaching and learning materials play a crucial role in facilitating mathematical play pedagogy, especially when using SBAs in ECCE settings. According to Caiels *et al.* (2023), SBAs build on the unique skills, interests, and abilities that each child brings to the learning environment. Therefore, TLMs support SBAs in fostering mathematical play by encouraging exploration and problem solving (MacDonald, 2018). Open-ended materials, such as blocks, counters, and sorting objects, encourage children to explore mathematical concepts at their own pace. These materials allow children to manipulate, compare, and categorise, which enhances their understanding of number, shape, and spatial relationships. Similarly, Evans (2021) maintained that children with different strengths (e.g., visual-spatial, logical-mathematical) engage with the materials in ways that build on their own unique ways of thinking. For example, a child with a strong visual sense might excel at sorting objects by colour or shape, while another with a logical approach might focus on counting or grouping.

Furthermore, TLMs promote active engagement and playful learning (Evans, 2021). Tools like counting beads, measuring cups, pattern blocks, and games with number recognition (e.g., board games with dice) foster active engagement. The playful nature of these materials invites children to play with numbers, shapes, and patterns in a fun and relaxed manner. Research (MacDonald *et al.,* 2021) shows that playful quality of the materials allows children to connect with mathematical concepts through activities that reflect their personal interests, whether playing a game involving numbers, creating patterns with blocks, or building structures that involve spatial reasoning.

The diverse array of TLMs supports diversity of learning styles. Children are given opportunities to engage with mathematics in ways that resonate with their natural strengths. For instance, children who are more auditory learners may benefit from math songs or rhymes, while kinesthetic learners may thrive with hands-on manipulative materials. TLMs also foster social interaction and collaboration (MacDonald, 2018). Group activities and collaborative materials like large puzzles or cooperative games encourage social interaction and collaborative problem-solving

(Beke, 2017). Children learn to respect each other's perspectives and strengths. For example, one child may excel at pattern recognition, while another is good at counting. Through collaboration, they can learn from each other, strengthen their communication skills, and develop a deeper understanding of mathematical concepts (Reikeras, 2020).

More so, as said by Rusdawati (2020), TLMs encourage autonomy and choice in the early learning environment. Offering children a variety of materials to choose from gives them the autonomy to decide how they want to engage with mathematical concepts (Ramani *et al.,* 2019). This also helps foster independence and confidence. Children are empowered to choose materials that align with their interests and strengths. For instance, a child with a strong sense of rhythm might prefer a counting song, while another who enjoys building might choose blocks to create structures, both engaging with mathematical concepts in ways that feel authentic to them.

The use of TLMs assists children in connecting mathematics to the real world. Everyday objects, such as buttons, leaves, coins, or even kitchen items, are used to teach mathematical concepts (MacDonald *et al.,* 2021). These materials ground the learning in the real world and help children see the relevance of math in their daily lives. SBAs incorporate children's prior knowledge and experiences, linking mathematical play to their personal lives. For example, a child who enjoys cooking might relate to using measuring cups and talking about fractions, while another child who enjoys nature might focus on counting leaves or sorting rocks.

In conclusion, according to Trundle and Smith (2017), TLMs build mathematical language in ECCE settings. Materials that include labels, number lines, or visual representations of mathematical concepts encourage the development of mathematical vocabulary. Children are introduced to mathematical language in a way that connects to their interests and strengths. Incorporating TLMs supporting mathematical play within ECCE settings not only fosters an engaging (Ramani *et al.,* 2019) and joyful learning environment but also taps into children's individual strengths. By using these materials in a strength-based way, teachers create a nurturing and inclusive space where children feel valued, capable, and motivated to

explore mathematical concepts. This helps them develop a positive relationship with math supporting their future learning and development.

2.11 Chapter Summary

This chapter explored the current knowledge and perspectives on SBAs focusing on mathematical play pedagogy in ECCE settings. I began by orientating the chapter, defining the concept of play and discussing its types and benefits in ECCE settings. I then explored play pedagogy in Lesotho ECCE settings. In embarking on this, I sourced information from recent international conventions, curriculum policies and early childhood journals. Continuing the review discussions, I dwelt on mathematical play pedagogy in Lesotho ECCE settings paving the way for SBA. Lastly, the literature review concluded with an in-depth exploration of the SBA as an area of focus for the current study. The SBA was explored through the lens of mathematical play pedagogy in ECCE settings. As a result, the literature reviewed attracted the social constructivism theory to frame this study and guided me as a researcher to achieve the study's aim.

CHAPTER THREE: THEORETICAL FRAMEWORK

> Social constructivism explains the process of knowledge generation based on the idea that social factors shaped by history and culture construct knowledge rather than a fixed representation of reality (Akpan *et al.,* 2020: 50).

3.1 Introduction

A theoretical framework is defined by Salawu *et al.* (2023) as the base, structure and support for a research study on which new knowledge is built. They associate the theoretical framework with the plan of a research project serving as a holding point for the literature review and, most significantly, the procedures and evaluation of the dissertation inquiry. Adom *et al.* (2018:438) stress the need for the development of the investigator's theoretical framework on the premise that the framework a researcher chooses is not chosen at random; rather, it represents significant personal views and understanding regarding the essence of knowledge, how it is revealed to the observer, and the possible functions and instruments the researchers may use. Grant and Osanloo (2014) add that a good plan delivers all the information required to gain insight into how the researcher has conducted the investigation and paints a clear picture of the study's inquiry; it connects with every step of the investigation procedure, including issues of conceptualisation, review of the literature, methods, discussion and presentation of the findings and conclusions (Adom *et al.,* 2018).

In this study, the conceptual structure that guided, directed and supported me in designing a solid plan that served as a foundation for understanding aspects of the research topic, namely exploring SBAs using mathematical play pedagogy in Lesotho ECCE settings. It also assisted in articulating all the steps and procedures needed to carry out this study. Merriam (2009) supports this idea by showing that the researcher's recommendations are included in the study's conceptual structure which may be considered an architectural layout that guides every step of the research journey. Cohen *et al.* (2018) similarly believe that the theoretical perspective aids in the selection, classification and organisation of ideas, procedures

and concepts of the research. Grant and Osanloo (2014) argue that theory-driven thinking is voiced in the choice of the research title, the process of developing research questions, the conceptualisation of the literature review, the design process and the analytical layout of the dissertation.

This study aimed at exploring strength-based teaching practices in ECCE settings through mathematical play pedagogy. I sought to understand how ECCE teachers employed SBAs in their settings, arguing that their awareness and understanding of SBAs were essential in this study. The theoretically oriented techniques and exercises participants employed in their instruction revealed their understanding of this methodology. Moreover, as a researcher, my greatest interest was in comprehending how the participants used SBAs in teaching and learning mathematics through play with children in their ECCE classrooms. This implies that during teaching and learning activities, the engagement in various interactions, methods and learning activities participants encouraged and enhanced in children were fundamental requisites and key informants to me as a researcher.

This study was framed by Vygotsky's notion of social constructivism (1968). The choice of social constructivism was motivated by my argument that the specific idea the study is connected to must be made apparent (Nhase, 2019). As a researcher, I believed the SBAs ideally matched the theoretical principles outlined in Vygotsky's social constructivism theory, hence this study's use of this idea. This study's primary goal and aims were to provide detailed explanations and critical accounts of what happened when following the study procedure. The data gathered during the investigation showed how theory and practice were related. I employed social constructivism to understand how participants applied SBAs in their ECCE classrooms to facilitate the playful learning of mathematics.

This chapter deliberates on the theory of social constructivism applied in this study. Detailed indicators of how this research employed this theoretical framework are provided. This discussion begins with a brief background of the relationship between the social constructivist theory and constructivism. It then moves on to the role of social constructivism in ECE, noting some of the criticisms levelled at the theory. The chapter also discusses the principles of social constructivism and outlines the

historical background of this study. Lastly, I discuss the implications of the use of this theory and present a chapter summary.

3.2 Social Constructivism

Jerome Bruner proposed the theory of constructivism in 1966 (Olorode & Jimoh, 2016), which emerged from the critics of traditional Western characterised by an objectivist epistemology and positivism (Yilmaz-Tuzun, 2008). The behavioural, constructivist and cognitive models are the most commonly used theories around the globe. In contrast, constructivism maintains that there is no knowledge outside of human minds (Nhase, 2019). The same perspective is shared by Shah (2019), who adds that understanding the world is not just something that waits to be discovered; instead, human beings construct knowledge through their interaction with the world. According to this theory, learning happens when students build their foundational knowledge via active engagement in a learning environment; the theory discourages students from memorising ideas and definitions in favour of empowering students to create their own meanings, understandings and concepts via exploration, which leads to the social part of constructivism (Akpan *et al.,* 2020) and Vygotsky's notion of social constructivism.

The retention and processing of knowledge by children during instruction are all explained by learning theories. According to social constructivism, language and culture serve as frames for humans to perceive, communicate and comprehend reality. Social constructivism implies that language is used to convey ideas, which are then interpreted and understood through experience and interactions in a cultural context. Extending this idea further, Vygotsky acknowledges that knowledge is not only socially produced but also co-made because the creation of cognitive frameworks needs the language and cultural diversity of a group of individuals. Vygotsky also argues that the way people think and see the world is influenced by language and culture. Building on this definition, evidence from research affirms that in a social constructivist perspective, knowledge is developed because of many social processes and interactions; hence, it is also a shared experience as opposed to a personal one (Akpan *et al.,* 2020; Lynch, 2019). This explains why it was used in this study as a theoretical lens to explore SBAs using mathematical play pedagogy

to discover how children acquire, retain and process information during instruction in ECCE settings.

3.3 Social Constructivism in ECCE

Constructivist teaching methods are used in programmes for preparing teachers and can effectively advance children's learning (Omodan, 2022). Akpan *et al. (*2020) believe that teaching methods/instructional practices/ pedagogies are the central aspects guiding classroom management and strategies used to deliver lessons and content to children according to preset learning objectives (Dorgu, 2015). In the words of Westwood (2008), teaching techniques are the strategies teachers employ to support children's learning. Combining the above definitions reveals ways and principles of teaching that accelerate children's learning (Dorgu, 2015; Westwood, 2008).

According to Dunphy *et al.* (2014), early childhood learning is frequently seen as a complicated process, difficult to understand fully through a single theory or perspective, regardless of the child's age or stage. Social constructivist viewpoints in ECE consider how important social interaction is in determining how children learn (Dunphy *et al.,* 2014). Palmer (2006) suggests that understanding social constructivism is crucial to the educational foundations of early childhood teachers as it suggests different instructional practices in the early childhood setting.

Similarly, Walls, Litjens and Taguma (2015:4) define early childhood education pedagogy as a collection of teaching methods and approaches that promote learning and offer opportunities for developing information, skills, attitudes and dispositions in a specific social and material context. Play-based learning in ECCE is defined by Weisberg *et al.* (2013) as a teaching methodology that combines child-directed, fun aspects with adult supervision and scaffolded learning objectives. Based on the above definitions, I believe that the principles (the ZPD and scaffolding, among others) and methods interwoven in social constructivism would enable me as a researcher to explore the SBAs used in mathematical play pedagogy in ECCE settings effectively and efficiently.

Göncü and Main (2023) indicate that social constructivism supports both teacher-initiated and child-initiated learning experiences, suggesting that early childhood teachers should take the initiative to set up a demanding learning environment for young children and have the pedagogical know-how and abilities to instruct while the children are playing, thus redefining teaching in ECE. Evidence shows that social constructivism and play pedagogy in early childhood settings share similar attributes. For example, Vogt *et al.* (2018) think of play and playfulness as essential components of education for young children, while good mathematics education for children occurs when children learn mathematics in the context of play when they are younger (ECMG, 2022).

Social constructivism similarly supports the notion that learning activities started by teachers and children are embedded in children's play (Göncü & Main, 2023). Most significantly, both play pedagogy and social constructivism assert that during play, children are exposed to new words, concepts and objects, as well as social and cognitive knowledge. Moreover, social, language, communication and academic skills are intertwined within play (Walther, 2019:11). Therefore, I view social constructivism as a suitable theory to form the basis for the current study even though it is criticised for relativism, objectivism, individualism and a lack of universality of mathematical knowledge. The next section outlines the criticisms of social constructivism in detail.

3.4 Criticism of Social Constructivism

Social constructivism is criticised for its relativism. Individuals share common knowledge regardless of their personal history of learning. Culture and knowledge are constantly changing, even though cultural variables have a powerful impact on the social process of education. This claim implies that, because cultures are formed from subcultures, even if the information gained and retained by people is not a strict replica of any socially produced template, each child learning a culture alters the culture. Therefore, culture and knowledge are prone to change over time (Fox, 2001:30).

Furthermore, social constructivism also poses a challenge to objectivism. Hazelrigg (1986) acknowledges that humans do not create objective truths; in fact, social constructionists believe that people create knowledge via interactions. This is a real challenge to empiricism, according to Bunge (2000), who also suggests that one should base their knowledge on what they see. This refutes the assertion made by social constructionists that history and culture shape knowledge rather than its being objective. No social construction can be more legitimate than another since all of them are equally valid and there is no such thing as an objective truth. Particularly in the context of scientific study, this is problematic. Constructivists argue that an unscientific explanation for a phenomenon is acceptable as valid in an empirical study. In this case, research does not yet clearly understand how constructivist studies impact society positively.

Recent evidence shows that social constructivism opposes individualism since it believes knowledge is defined by information exchange between two or more individuals (Omodan, 2022). Similarly, social constructivism poses a real threat to conventional teaching methods. Children are viewed as impartial information consumers, and education is supposed to be purposeful, coherent and working towards a conclusion. Teachers are the main sources of knowledge in this context. In contrast to traditionalist beliefs, social constructivism maintains that knowledge is a product of individual constructs of a common world rather than something that is predetermined. According to social constructivists, education is an active process in which children continuously rewrite the past via their relationships with other people (Omodan, 2022).

According to constructivists, mathematics comprises only the objects that individuals construct themselves; constructivists cannot explain how mathematical knowledge can be universal (Dunphy *et al.,* 2014). Constructivism centres on how humans create mathematical understanding and knowledge (Stemhagen, 2009) but does not show how this notion manifests in teacher practices. However, it seems reasonable that a particular selective affinity exists between a constructivist philosophy of mathematics and constructivist teaching methods (Stemhagen, 2009). Hence, I considered it vital that social constructivism served as the theoretical foundation for this investigation.

3.5 The Relevance of Social Constructivism in the Present Study

Despite these criticisms, I believe that the effectiveness and efficiency of social constructivism have added interesting and important dimensions to education and educational studies. The social constructivist lens includes social activity involving reciprocal sharing between individuals, encouraging children to discuss their viewpoints rather than concentrating on concepts and ideas. According to Omodan (2022), in social constructivism knowledge generation is participatory through its principle of information sharing.

In this regard, Churcher's (2014) argument provides more evidence that social constructivism is participative and has the potential to generate solid knowledge, supporting the proverb that states, “Lets’oele le beta poho”, a Sesotho proverb which simply translates as unity is power (Ramatea, 2023). This proverb emphasises the importance of working together, which aligns with Muro and Jeffrey (2008), who affirm that social constructivism facilitates the generation of new knowledge through collaboration and interaction among individuals. Through social interactions, people can develop knowledge and understand others’ perspectives. Furthermore, social constructivism has been acknowledged as an idea that improves learning for people in educational institutions, classroom settings and beyond (Omodan, 2022).

Social constructivism was used in this study to unpack the SBAs teachers use in mathematical play pedagogy in the ECCE settings – this addressed the second research question (see Section 1.5.4). Keeping this in mind, I used social constructivism because I observed play pedagogy in mathematics as a cooperative social activity between the teacher and the children applied to achieve instructional objectives. I also believe that a child-centred approach to learning mathematics in classrooms improves children's performance. This claim is made because the best instructional strategies with engaging learning activities (discovery methods) stimulate thinking, substituting dull passivity. This claim supports those made by Kalpana (2014) that social constructivism offers opportunities for children to be actively engaged in their education as opposed to being passive information consumers. Given this background, I believe social constructivism was highly significant and appropriate for this study.

Furthermore, I believed that through social constructivism and collaborative learning, children could work together during mathematical play activities, exchanging ideas, sharing their strengths and helping each other in problem-solving. Both social constructivism and SBAs work with shared responsibility, relevance and the practicality of solutions to jointly motivate people's interest in finding solutions to problems. This implies that the intensive use of social constructivism and strength-based learning are synonymous and harmonious having the ability to solve problems. This also supports the claims made by Kalina and Powell (2009) that social constructivism helps children think critically and solve issues. In both concepts, people can connect, collaborate, and solve difficulties because of their sociality. Under such circumstances, collectivism replaces individuality, and an individual's problem becomes everyone's concern. Similarly, group accountability helps individuals resolve disputes and find answers to their day-to-day issues (Schreiber & Valle, 2013).

This study focused on the SBAs in early learning settings using mathematical play pedagogy. Social constructivism correlates explicitly with SBAs in mathematical play pedagogy in the following ways: both advocate collaborative and individualised learning, positive reinforcement, motivation and engagement, and an awareness of the ZPD and strengths when they are properly integrated. For instance, teachers may successfully encourage young children's mathematical learning and engagement by setting up a collaborative and supportive learning environment that acknowledges and builds on children's mathematical abilities and strengths. Hence it can be concluded that social constructivism and SBAs are the practical frameworks for advancing the interests of individuals and communities to guarantee that the focus of the intervention is the person, their lives, and their circumstances. The following section and subsections articulate the principles of social constructivism that supported this study.

3.6 Principles of Social Constructivism

It is worth indicating that Vygotsky laid the foundation for social constructivist educational theories. Although he died in 1934 his work lived on and was refined by scholars in the 20th century. According to Vygotsky (1978), social constructivism is

guided by the following principles: knowledge as a social product, the ZPD, scaffolding, social interaction, language or private speech, cultural context, engagement, reflection and metacognition, multiple perspectives and constructive assessment and feedback. Scaffolding was added as a social constructivist principle in Vygotsky's list, even though the term is attributed to Wood, Bruner and Ross (1978).

In exploring SBAs using mathematical play pedagogy in ECCE settings in this study, I employed the following social constructivist principles: the ZPD, scaffolding, engagement, language, social interaction and cultural context. These were deployed to discover the SBAs that were revealed by teaching methods occurring during instructional interaction; to understand the role played by language during engagement between children and teachers; the influence of cultural tools in the facilitation of lessons and most importantly, the kinds of support teachers offer children during play pedagogy in ECCE settings to help children to reach their full potential. The above principles were important because the study aimed to explore teachers' SBAs that support children's mathematical play pedagogy in ECCE settings (see Section 1.5.1). The next subsections give a comprehensive account of the principles underpinning this investigation.

3.6.1 The ZPD and scaffolding in learning

The ZPD or Zero-point Productivity Deficit was propounded by Lev Vygotsky (Vygotsky,1896–1934/1978) and scaffolding by Bruner (1974). The difference between a child's developmental level as assessed by autonomous problem-solving and their prospective development level as assessed by working with more experienced peers or under adult supervision while addressing problems was emphasised in Vygotsky's definition of the ZPD (Vygotsky, 1930–1934/1978:86). Vygotsky believed that when a child is in the ZPD for a specific activity, offering the right help will provide sufficient encouragement to accomplish the task. He further indicated that social interactions with an experienced teacher that allows children to exercise their abilities as well as scaffolding supportive activities given by the teacher or a more experienced peer to help the child as they are led through the ZPD were the three key elements that teachers were encouraged to concentrate on to help a

child move through the ZPD (Woods, Burner & Ross, 1976). Defining it briefly, ZPD refers to the gap between what a child can achieve independently and what they can do with guidance and support from an experienced teacher (McLeod *et al.,* 2003).

Dewey (1938) posits that learning is a social activity children do as they work with classmates and teachers to accomplish learning objectives. To accomplish the primary goal of learning and education which is the entire development of individuals, all teaching and learning should entail the sharing and negotiation of socially constructed knowledge (Vygotsky, 1930–1934/1978; Kapur, 2018). Similarly, Hein (1991) holds that a child's prospective growth, or academic accomplishment, is determined by the stage of development they can attain with the help of peers or teachers. According to him, learning is a social activity involving interaction with others, such as family, friends and previous acquaintances. Social constructivism acknowledges that social learning involves dialogue and interaction with others and applying information as the crucial components of education and a way to meet learning goals.

Vygotsky also argues that lifetime growth depends on social contact and that social learning leads to cognitive development. For example, Vygotsky (1978) believes that cognitive growth arises from social interactions and supervised learning inside the ZPD as children and instructors co-construct knowledge. In other words, any learning tasks (irrespective of the difficulty level) may be accomplished by children under adult instruction or with peer participation. Therefore, it is reasonable to infer that social constructivism supports creating opportunities for children to work with their classmates and teachers to build knowledge and comprehension.

Similarly, Topciu and Muftiu (2015) stated that moving from the teacher’s help to independence is called scaffolding. Turuk (2008) further affirms that a more capable participant may assist the youngster in progressing to a higher level with the knowledge and skills acquired through language and other supporting conditions. Because learning, particularly in schools, is viewed as an achievement with assistance, scaffolding is an instructional framework in education through which the teacher displays the approach or process of learning before passing this duty to the children (Pollard & Tann, 1993). Based on the above inference, I can argue that

through scaffolding, children are given the appropriate level of support at the appropriate moment, leading to children performing a task with some assistance. In this way, learners move closer to mastering that specific task.

This study set out to determine the gap between children's actual developmental level and possible advancement by attempting tasks under teacher guidance. To explore the SBAs in the ECCE settings to address the second research question (see Section 1.5.1), the ZPD assisted me in finding out what children could do on their own and what they could accomplish with direction and support from a teacher. Most importantly, an instructional social interaction in which the teacher replicated the strategies, activities or tasks of learning and then transferred this duty to children assisted me as a researcher in seeing the SBAs in the ECCE classrooms. My analysis of classroom observations through the lens of the ZPD aided in detecting the instances where teachers provided scaffolding or support to help children reach their potential during their lessons. This implies that these instances were significant for identifying the themes that shaped the findings of this study.

3.6.2 Mediation in learning

According to Vygotsky's theory, mediation is prominent in comprehending how societal, institutional and historical contexts influence human mental functioning. These settings influence and supply the cultural skills people learn to develop this functioning (Vygotsky, 1930–1934/1978). Vygotsky also claims that the origin of mediation might be either a physical instrument, a set of symbols, particularly language, or the social conduct of another person. He believes signs are auxiliary means of solving a given psychological problem and further acknowledges that mediation of learning uses cultural techniques to accomplish objectives and give learning significance for cognitive change (Vygotsky, 1930–1934/1978:52).

Mediation of learning consists of the group members' verbal interactions and the assistance of a more experienced individual (Eun, 2019). Ramasike (2016) defines learning mediation as a method that focuses on how knowledge is acquired during the learning process. This study's mediation process was significant for addressing the second and third questions (refer to Section 1.5.4), with data collected through classroom observations and semi-structured interviews. This theoretical principle

was intensively drawn upon to analyse data gathered to achieve this study's second and third objectives.

Dewey (1938) affirms that education is an active and beneficial process in which children construct knowledge through cognitive processes, involving more than just telling and receiving information. In the social constructivist classroom, through learning mediation, children construct knowledge to stimulate their mindset using tools in their environments because that is how the mind works. According to Kapur (2018), thinking, accepted wisdom and judgement are involved in creating new knowledge and information. The new ideas and philosophies can only be seen by linking them to the prevailing conceptions. Therefore, people's thoughts, knowledge and information are not absorbed in their original form but are rather changed and assessed.

Lynch (2016) asserts that the mediation of constructivist learning connects learning with meaning just as much as gaining new information. The learning process requires the children to engage in creative endeavours and exercise self-organisation. Teachers should let their children answer questions, develop notions and test them for viability. Building on the above inference, Omodan (2022) argues that the mediation of learning through social constructivism is more beneficial than what occurs in conventional classrooms because it sees children as engaged learners who share diverse learning experiences and ways. Social constructivism maintains that individuals have distinct worldviews influenced by their shared experiences and social interactions, which results in various approaches to knowledge and understanding.

Similarly, research findings also support the effectiveness of social constructivism in the classroom; it clarifies for children what they are learning and how to apply it outside the classroom (Atwater, 1996; Schreiber & Valle, 2013). This supports Kalpana's (2014) claim that the mediation principle permits youngsters to participate actively in their education rather than only being passive information consumers. Furthermore, it might be said it fosters cooperation by providing several avenues for educational pursuits, including pattern recognition, idea correlation, inference drawing and brainstorming. Mediation in social constructivism is a practical method

of instruction that considers children's viewpoints and diverse learning preferences (Kalina & Powell, 2009; Kim, 2001). It also allows children to voice their thoughts about what they are learning, contributing to knowledge derived from individual experiences (Kearney & Treagust, 2001).

In this way, teachers find social constructivism appealing because of its views on the individual's performance, the importance of improvement and children's active engagement. Teachers are typically aware of the importance of prior knowledge when teaching their students as children are not empty canisters or blank slates waiting to be filled with knowledge. Rather, learners are viewed as actively constructing new understandings by drawing on broad historical practices, facts, data and ideas. Kapur (2018) further indicates that teachers' instructional strategies in social constructivism agree with current learning research. Teachers create curricula and instructional methodologies that go beyond rote learning to meaningful learning that is more likely to result in more permanent retention of knowledge (Jones & Brader-Araje, 2002). They do this by viewing learning as a dynamic process, considering children's prior knowledge, building on preconceptions and eliciting cognitive conflict.

The study examines teachers' mediation of mathematical instruction and learning through play in ECCE settings, focusing on SBAs, resources, English language, and methodologies employed. The medium of instruction used in the participating ECCE settings conflicted with the Lesotho Education Language Policy (MoET, 2019), which stipulates that Sesotho as a mother tongue is the medium of instruction from grade zero to three. This view is also maintained by Mavuru and Ramnarain (2019), who postulate that the native language of children can be a help instead of being perceived as an obstacle. Consequently, their mediation was also influenced by culture and language, which are significant tools in the mathematical play classroom. It also aligns with the definition of mediational methods by Vygotsky, which refers to unique approaches within a particular setting (Vygotsky, 1978). I used this mediation principle to understand how the participants in their various settings or educational institutions handled SBAs using mathematical play pedagogy through classroom observations.

3.6.3 Social interaction and learning

Vygotsky (1930–1934/1978) believes that social interaction is critical for cognitive growth and that learning is a socially influenced process. His ideas were expanded in 1981 when social circumstances were regarded as the origin of development. Vygotsky's argument was motivated by the point that any role in a child's cultural development may be seen in two different ways: on the social plane and then on the psychological plane. According to Vygotsky, growth occurs as an intra-psychic activity between two or more persons. Daneshfar and Moharami (2018) and John-Steiner and Mahn (1996) similarly argue that an individual's growth depends on the transmitted experiences of others. Following McRobbie and Tobin's (1997) theory of social and individual planes, knowledge is first obtained through interactions with others and the immediate environment on the inter-psychological plane, and subsequently for personal value through assimilation and internalisation of the learnt knowledge on the intra-psychological plane (McRobbie & Tobin, 1997; Stott, 2016); learning does not occur in isolation. Social and individual interactions with others support mental processes and functioning at all levels (Scott & Palincsar, 2013; Vygotsky, 1981). Therefore, social interaction was prominent in this study because, through direct classroom observations, I discovered whether participants engaged children in socially interactive activities that stimulated thinking.

The social interaction principle sees knowledge as constructed through human activity. Omodan (2022) posits social constructivism as a paradigm shift that asserts that individual interactions and experiences shape knowledge. According to Shah (2019:5), humans create knowledge through their interactions with the outside world; information about the outside world does not just exist waiting to be discovered. Furthermore, Kapur (2018) emphasises that several methods and contexts are involved in the social creation of knowledge. It can be attained by group dialogue, cooperation, classroom instruction at a school or training facility, social media platforms, places of worship and marketplaces. The importance of a group's language and culture in the construction of cognitive structures was emphasised by Akpan *et al.* (2020). As a result, knowledge is jointly as well as socially formed.

According to Kukla (2013), social constructivists believe humans create reality through human activity and it is impossible to find because it did not exist before it was socially constructed. Instead, members of society create reality through the world's characteristics and individuals then give them meaning via their interactions with one another and the things in their surroundings. Furthermore, according to Lave and Wenger (1991), the relationships between practitioners, their activity, the social structure and the political economy of practice communities are where a society's practical knowledge is situated. Because of this, learning needs to incorporate both these concepts and activities (Gredler, 1997; Lave & Wenger, 1991). What matters most is the type of social connection children have with adults who are informed about society. Learning the social meaning and practical applications of crucial symbol systems can be facilitated by social engagement with more experienced individuals. Little ones build their understanding and reality through interactions with adults, which helps them to improve their cognitive skills.

According to Shah (2019), the possession of knowledge is not a privilege bestowed upon certain people and denied to others. Knowledge is generated through collaborative efforts, where individuals share ideas, explain issues from their perspectives, and create meaning. Understanding oneself, the world and the links among them is a process of inquiry and creativity that humans engage in actively and restlessly. Children who are taught through constructivism develop, interpret, and reorganise their own knowledge, according to Shah (2019).

In this study, the existence of a social interaction space had a significant influence. For instance, the interactions between teachers, children and peers in the participating ECCE settings offered possibilities for conversations, meaning making and exchanging various viewpoints, highlighting the significance of robust collaborative learning experiences emphasised by the social interaction principle. This situation permitted me to determine participants' understanding of the concepts and ideas surrounding SBAs to respond to the study's first research question, "*What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?"* In fact, the same interactions made it possible for me to see through the direct classroom observations the SBAs that were evident during the teaching and learning processes, and this evidence helped in responding to the

second research question: "*What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?"* Similarly, the same interaction helped me to see how TLMs facilitate mathematical play pedagogy in response to the third study question, *"How do TLMs facilitate mathematical play pedagogy using SBAs in ECCE settings?"* This evidence collected through observation sheets also informed data analysis and the study's findings.

3.6.4 Language in Learning

Vygotsky (1978) postulated that language provides the framework through which people comprehend, communicate and experience reality. Vygotsky also maintained that language and culture were crucial for children's intellectual growth and how they saw the world because ideas related to learning were communicated through language, as experienced and understood through interactions within a cultural setting. Consequently, language is seen as essential – for example, in speech, where the constructivist learning theory enables children to share what they have discovered, and teachers employ language to direct children. A similar sentiment is expressed by researchers (Akpan *et al.,* 2020; Leeds-Hurwitz, 2009) who consider language to be an essential tool for people to create reality. This implies that according to social constructivism, adaptive interactions with the physical world impact children's knowledge and interactions between people in a cultural, meaningful and relevant world, made so largely by language.

Similarly, as a researcher, I believe children actively develop and seek knowledge using language in a constructivist classroom. The claim is that social constructivism emphasises collaborative learning, which includes children working together, sharing ideas, and collectively constructing knowledge through group activities, projects and discussion. Social constructivism encourages children to participate in group projects and discussions to develop their talents. As a result, in a social constructivist classroom, teachers promote participation from their children and the development of original thought. In addition, the teacher promotes student collaboration to advance each other's knowledge. The teacher also facilitates children's discussion and cooperation. To do this, teachers who employ the social constructivist learning model scaffold lessons as needed, encourage group work, ensure children feel comfortable

asking or answering questions, and prod them to express their thoughts (Akpan *et al.,* 2020). Therefore, it is reasonable to infer that the above aspects are achieved through communication informed by language.

In this study, the language teachers used determined how they mediated mathematical play pedagogy through SBAs. For instance, English was the medium of instruction dominantly used in all the participating ECCE settings. It is also worth noting that Sesotho was slightly used. Hence, teachers made a deliberate language choice when mediating or communicating ideas and mathematics concepts to children during classroom interactions. This is motivated by Vygotsky's (1978:25) notion:

> The importance of a child's words in achieving the objective is equal to that of action. Children don't just talk about what they are doing; their speech and behaviour are intertwined as a single, intricate psychological process to find a solution to the issue at hand.

In particular, Vygotsky (1986:18) argues that thinking takes the form of play in early learning before reality happens. Vygotsky further indicated that play dominates. There is so much imagination in a child's mind that it is hard to tell the difference between it and purposeful creation that they think to be reality (Vygotsky, 1986). The bottom line is that in early learning environments, social, language, communication, and academic skills are intertwined within the play (Walther, 2019:11).

3.6.5 Cultural context

According to Vygotsky (1978), education aims to impart cultural skills, like language, so children may think lucidly and imaginatively and gain assurance in their capacity to articulate their opinions. Vygotsky contends that culture significantly impacts and shapes development because, according to Gupta (2006) and Vygotsky (1978), experiences and knowledge are produced and developed within the contexts of society. Hence, culture has a significant influence on development. A similar view is postulated by Windschitl (1999:752), who adds that children undergo intellectual changes as they make sense of formal educational experiences about what they already know, the cultural and social settings in which ideas are expressed and various other influences that mediate understanding.

This is evident in classrooms when sensitive teachers consider children's cultural diversity to strengthen teaching and possibilities for growth and learning in educational settings (Mavuru & Ramnarain, 2017; Mori, 2014). As stated in Section 3.2.3, cultural tools are given to children during social interactions to facilitate understanding, clearly indicating what happens in the classroom setting. This concept resonates with Lee (2015), who opines that teachers' use of cultural resources or tools in the classroom reveals a great deal about their familiarity with their learners' backgrounds.

Vygotsky (1978) also suggests that community plays a central role in constructing reality. For Vygotsky, community upbringing and surroundings influence children's thinking. Social, cultural and political ramifications arise from the information generated inside a society. Individuals within a community acknowledge and uphold the collective perception of specific facts, values and truths. Such information spreads even further when new community members embrace it. Concepts of power and privilege are institutionalised when a community's accepted knowledge becomes policy. As a result, these socially produced beliefs create social reality within communities. This suggests that to use children's unique cultural backgrounds as a basis for learning, teachers should consider the importance of culture and support collaborative learning strategies among children and communities (Jett *et al.,* 2016). Moreover, education has a critical role in ensuring that societies adapt and bring about social justice for those who have been disadvantaged (Heijnen-Maathuis, 2008). Thus, in the context of strength-based pedagogy, equity and diversity are the enablers that entail a shift in mindset for professionals, teams, organisations, communities and individuals (UKDHSC, 2019).

In line with this study, the teachers, as the more knowledgeable others in the ECCE settings, were the prominent figures throughout the mediation procedure because they needed to demonstrate an understanding of their children, their classroom cultures, the school's culture and their contextual backgrounds. This study found that each of the factors above contributed to the planning of the lessons taught including how the participants made accommodations for their children when using mathematical play pedagogy. This implies that the child is included in cultural activities at home, in the classroom and in the community. This also means that

children can express their thoughts and make sense of their reality (Fleer & Pramling, 2015).

According to Vygotsky, authentic learning occurs in the social constructivist activities included in the ZPD, allowing children to internalise more complex psychological processes. Teachers (participants) played a crucial role in providing their children with the activities within their ZPDs and scaffolding them to reach their maximum potential (Vygotsky, 1978). In general, this study's cultural aspect related to the resources used in the classroom, the vocabulary employed in mediation and how participants interacted with their children to achieve the learning objectives (Ajayi, 2009; Lee, 2015; Schwarzer & Jerusalem, 1995).

As discussed earlier, social constructivism framed this study and contributed to the participants' instruction or mediation of learning in their classrooms. Social constructivism recognises that social and cultural factors influence learning and the construction of knowledge. Because different cultures have various means of understanding and interpreting the world, and because these cultural perspectives shape an individual's worldview and knowledge base, it was crucial in this study to understand how cultural norms, values and backgrounds affected children's learning experiences and the teaching techniques used by teachers. Analysing semi-structured interview responses and classroom observations from this angle enabled me as a researcher to explore these influences more deeply.

3.7 Chapter Summary

This chapter explored how Lev Vygotsky's social constructivism learning philosophy framed this study. Social constructivism was defined in ECE, as an area of focus of the current study. Several criticisms were brought to light as part of the research journey. I also indicated the relevance of social constructivism for this study. In particular, I used the social constructivism principles as a framework to understand, describe and interpret the data, revealing teaching practices. The data were gathered through direct lesson observations in classrooms and interview information from the participants. The research design and technique used in this study are described in the next chapter.

CHAPTER FOUR: RESEARCH METHODOLOGY

> When researchers decide to gather qualitative data, they consider the kind of tools and interview methods that would best enable them to comprehend the main phenomena and provide answers to the study's objectives (Letuma, 2023: 97).

4.1 Introduction

This study emanates from unattended concerns and questions arising from the literature reviewed in Chapter Two on mathematical play pedagogy in ECE settings, mainly through the lens of an SBA. This chapter offers comprehensive descriptions of this study's design orientations and justifications. It explains the research methodology, paradigm, study design, sampling and data-gathering techniques as well as data analysis strategies. I also present the profiles of the respondents as well as my background and positionality as a researcher. The chapter concludes with a consideration of the ethical and practical issues that guided the study and the fieldwork experiences.

The primary research question for this study was:

How do teachers support children's play pedagogy in mathematics using SBAs in the ECCE settings?

The following secondary questions directed the investigation in answering the above question:

1. What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?
2. What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?
3. How do TLMs facilitate mathematical play pedagogy using SBAs in ECCE settings?
4. How do SBAs support and strengthened mathematical play pedagogy in ECCE settings?

This chapter gives a detailed outline of the methodological procedures followed to obtain evidence in response to the above research questions. The respondents' school settings and contexts were also described to embed my understanding of the teaching practices that promoted mathematical play pedagogy using SBAs in the ECCE settings.

4.2 Research Paradigm

According to Kivunja and Kuyini (2017), a paradigm is a philosophical way of thinking. It entails four elements: epistemology, ontology, methodology and axiology (Alharahsheh & Pius, 2020). Ontological assumptions affect our epistemological inclination, influencing research methods and design (Atoro, 2020). Building on this, Cohen *et al.* (2018) describe an educational research paradigm as the worldview of a researcher. Kivunja and Kuyini (2017:26) maintain that a worldview is a perspective, thinking, school of thought, or set of shared beliefs that inform the meaning or interpretation of research data.

Kivunja and Kuyini (2017) further highlight that a research paradigm is a conceptual lens that the researcher uses to analyse the methodological components of the study to identify the data analysis techniques employed. Maxwell (2018) adds that, while researchers are free to choose the paradigm they prefer, it needs to be harmonious with the theoretical and conceptual framework, research questions and data gathering and analysis techniques used for the phenomenon under investigation.

The study opted for an interpretive paradigm. An interpretive or constructivist paradigm (Kivunja & Kuyini, 2017) is underpinned by relativism (Nieuwenhuis, 2016) and knowing the universe using the subjective perceptions of particular people (Cohen *et al.,* 2018; Kivunja & Kuyini, 2017; Nieuwenhuis, 2016). It is taken for granted that individuals create reality socially and amalgamate their personal and conscious minds as they engage with the outside world (Cohen *et al.,* 2018). Sharing the same view, Alharahsheh and Pius (2020) maintain that interpretivism recognises the world's complexity and acknowledges that reality can only be accessed using social constructions made through language, consciousness and shared meanings. This idea is corroborated by Kivunja and Kuyini's (2017) argument that interpretivism subscribes to social constructivism, implying that through social interactions, people

from different origins, and with different presumptions and experiences contribute to the continuing production of reality that exists in their larger social environment (see Section 3.6.3).

Despite the good intentions of the interpretive paradigm, it is criticised for its ontological view. According to Pham's (2018) ontological perspective, research tends to be subjective rather than objective because of the researcher's interpretation, personal beliefs, thought processes and cultural preferences, all of which may be open to bias. Secondly, interpretivism does not seek to generalise findings to other situations; rather, it seeks to acquire a deeper comprehension and knowledge of events within the complexity of the context (Cohen *et al.,* 2018). As a result, it frequently fails to include a step in employing systematic processes to verify the validity and use of research findings.

Lastly, interpretivism is criticised for not discussing how politics and ideology affect social reality and knowledge (Pham, 2018). It places more emphasis on comprehending contemporary events than it does on the issues surrounding the empowerment of individuals and society. As a result, it ignores the power and agency dynamics that exist in our community (Pham, 2018). It is interesting to note that this particular criticism may have contributed to the rise of critical inquiry in improving the viability of research (Pham, 2018).

However, the choice of interpretivism in this study was motivated by Kivunja and Kuyini's (2017) argument that this approach helps the researcher to get into the head of the subjects being studied to understand their view of the subject being observed, rather than the viewpoint of the observer. In this case, the participants (teachers) used a variety of techniques based on their personal teaching experiences and views to instruct children in their contexts through play using SBA in the ECCE settings. Moreover, the participants were observed to comprehend and make sense of their thinking and the sense they were making of their context rather than the observer's (researcher's) understanding, interpretation and beliefs. An interpretive paradigm also allowed me as a researcher to be an insider, uncovering individuals' own viewpoints or interpretations of social occurrences (Frechette *et al.,* 2020). For

these reasons, I felt that an interpretive orientation would be appropriate for this study.

4.3 Research Approach

This research used qualitative methodology. Unlike quantitative and mixed methods, qualitative studies emphasise words (Cohen *et al.,* 2018; Yin, 2018; Maree, 2020) instead of drawing on the quantification of data gathering and analysis. Qualitative studies are concerned with the meanings people attach to things in their lives (Mazinga, 2021). Alharahsheh and Pius (2020) define the qualitative research approach as the description and interpretation of assumptions, which are fundamental to shaping the selection and application of research methods, procedures of data collection and analysis techniques. According to Cohen *et al*. (2018), a qualitative approach generates rich narrative data and calls for non-numerical information which the researcher gathers during the interaction with the participants (Creswell, 2020). Qualitative approach also promotes the idea of more than one method of data generation including observations and interviews (Yin, 2018).

The qualitative approach was chosen because it guides research in providing a detailed explanation of phenomena, culture, social reality, discourse, theory and experience that could not be achieved through quantitative data gathering (Creswell, 2020). Interpretivism, constructivism and inductivism are the three perspectives that best encapsulate the tenets of the qualitative method (Pizarro, 2014). In particular, social constructivism was employed to frame this study (see Section 3.2) to help me dig more deeply into the phenomenon and also to enable me to comprehend the phenomenon being studied from the viewpoints of the participants (Creswell, 2020; Kyngäs, Mikkonen & Kääriäinen, 2020; Leedy & Ormrod, 2020). The study explored strength-based approaches using play-based pedagogy and how these might be improved to enhance mathematics instruction and learning outcomes in ECCE settings.

A qualitative research approach was further motivated by the study's leaning towards certain ontological and epistemological orientations. The study of ontology is concerned with the essence of being and the structure of reality essential for

understanding the social world of meanings (Atoro, 2020). In this investigation, I assumed that the ECCE settings investigated were populated by teachers who bring their own thoughts, interpretations and meanings. Therefore, my investigation used interviews and observations to interpret teachers' opinions, feelings, experiences and inner thoughts.

Similarly, the epistemological stance used in this investigation was the constructivist belief that teachers' activities, both within and outside of interactions, are what determine knowledge and the reality of what happens between teachers and children within the social context (ECCE settings). Qualitative research was chosen for its belief that people's interactions with the environment around them shape, produce and entrench their experiences, conceptions, perceptions and meanings (Ntawa, 2019). This orientation assisted me as a researcher in making sense of teacher practices from the perspective and perceptions of the reality of the research participants (Mazinga, 2021).

4.4 An Interpretive Phenomenological Research Design

The interpretive paradigm influenced the research design and methodology (Kivunja & Kuyini, 2017). This aligns with Maxwell (2018), who acknowledges that a paradigm should be compatible with the theoretical and conceptual framework, research questions and the methodology implemented in the inquiry. The process of looking for responses to research inquiries (see Section 4.1) regarding how the participants see their world constituted the research design that I used in this study. According to Creswell (2020), research design defines the procedures for conducting research. Similarly, Creswell *et al.* (2016) assert that a research design is a collection of methods and techniques that enable an investigator to collect and analyse data.

According to Tuohy *et al.* (2013), interpretive phenomenology is the study of understanding and interpreting participant experiences, emphasising experience, description and interpretation. The being-in-the-world (dasein), fore-structures, the hermeneutic circle and life-world existential themes which form the basis of the discussion are some of the key concepts within interpretive phenomenology that Frechette *et al.* (2020) highlight. Relevant methodological concerns include the

research paradigm, the researcher's stance or positionality, the research objective and research questions, sampling and recruitment, data collection and data analysis.

Tuohy *et al.* (2013) offer the following definitions: **Dasein** is the process in which the researcher situates humans in the participant's world to understand the relationship between experiences and social, cultural and political environments. **Fore-structure** is the prior knowledge/understanding and/or experience. **Hermeneutic circle** refers to how repeated circular interpretive processes lead to understanding. Lived time, lived space, lived body and lived human interaction are four **life-world existential themes** significant to people's previous experiences that impact and shape current and future experiences.

This study set out to explore SBAs using mathematical play pedagogy; I sought to learn the core of the participants' experiences in their context which I linked with dasein. Understanding children's dasein in mathematical play pedagogy enabled teachers to comprehend their distinct experiences and viewpoints. This made it easier to customise lessons so that they speak to children's interests and life experiences and encourage deeper engagement with mathematics in the physical environment of a classroom. As a researcher, I decided to explore participants' lived experiences because the location of the ECCE settings influenced them. For instance, the building's dimensions and kind – that is, being in a rural or urban area - enabled me to understand that experiences were connected to the world where participants lived. Having arrived in a classroom setting that was both developmentally and culturally appropriate, several other factors had to be taken into account while planning for interaction.

Furthermore, I associated the fore-structure and hermeneutic circle with interpretive understanding occurring cyclically using prior knowledge and experiences. For example, within the framework of pedagogy, teachers gained a more profound comprehension of children's mathematical reasoning via repeated discussion and introspection in the participating ECCE settings. Children's perceptions and experiences shaped instructional strategies as they played with mathematics, resulting in a dynamic understanding loop that improved learning. As a result, children's past experiences, memories and sensory data from mathematical play, as

well as the teaching and learning contexts that arose from it, all influenced interaction styles and helped to give the impression that learning was occurring.

Most importantly, contextual relevance was revealed in life-world experiences and realities that shaped individuals' understanding in this study. By recognising children's real-world experiences, teachers related mathematical ideas to real-world situations and increased the relevance and relatability of learning through mathematical play pedagogy in the participating ECCE settings. Children were able to participate in the learning process because of the qualities that come from their backgrounds. This implied that interpretive phenomenology was a viable approach that directed this kind of research. This is so because understanding and interpreting people's experiences is a crucial component of interpretive phenomenology (Frechette *et al.,* 2020). Consequently, I believed that this approach would be perfect for this study design as the research aimed to comprehend, describe and analyse human behaviour as well as the meaning that people ascribe to their experiences (Gill, 2020).

According to Taylor, Bogdan and DeVault (2016), the social constructionist principle holds that people's actions and statements reflect how they view the world. This principle correlates with Kivunja and Kuyani (2017), who argue that phenomenology implies a relationship between people's conceptions of the universe with 1) the interactions they have with others, 2) how they perceive others to perceive them, 3) how they have learnt to deal with life experiences, 4) the amount of perceived control they have, and 5) the significance of perceived control to them. In this study, for example, while attempting to comprehend the experiences of teachers in a school's teaching and learning process, the interpretive phenomenology principle was appropriate because it permitted the analysis of the participants' reality as perceived by them (Kivunja & Kuyani, 2017).

In summary, Kivunja and Kuyini (2017) argue that in phenomenology participants, data collection methods, tools applied and data analysis are all included in the large field of methodology. In maintaining a naturalist methodology, I utilised information acquired through semi-structured interviews and classroom observations, acting as a non-participant observer (Maree, 2020). Maxwell (2018) similarly suggests that

qualitative studies help gain an understanding of the significance of the events and the stories of the participants' lives and experiences for research participants.

Concerning this study, how participants taught in their classes provided evidence of their grasp of the strength-based approach and mathematical play teaching. Their approaches and techniques demonstrated their understanding of the discipline, context, curriculum and children's knowledge (Maraisane, 2022). This was also clear from the instructional materials, classroom layout and the goals of each course that I saw as a researcher. This was crucial in demonstrating their understanding of and expertise in the tasks they were carrying out in their classes. According to Frechette *et al.* (2020), phenomenological research is crucial for comprehending the unique context in which participants operate and the impact that particular context has on their behaviour.

4.5 Purposive and Convenience Sampling Techniques

Qualitative research involves selecting and deciding on a suitable demographic or sample to research (Boyle & Schemierbach, 2020; Creswell, 2020). The above scholars further argue that a population sample is a chosen subset typically used to represent a larger population and that the sample depends heavily on the researcher's judgement (Shaheen, Pradhan & Ranjeev, 2019). This also speaks to Leedy and Ormrod (2020) who add that the sample is the group of individuals, participants or respondents from whom data are gathered. Qualitative sampling maximises the usefulness of data acquired from a small sample. This implies that the selection of the participants is based on the expectation that they will be informative and knowledgeable of the phenomenon the researcher is studying (Creswell, 2020; Leedy & Ormrod, 2020). Therefore, the researcher will likely strengthen the possibility of gaining insights into the topic through the power and logic of qualitative sampling.

According to Boyle and Schemierbach (2020), sampling is an essential step in interpretive qualitative research. The site of this research - Berea - was purposively and conveniently chosen for this study because its engagement in implementing the ECCD curriculum made the academic research on exploring SBAs using mathematical play pedagogy in ECCE settings relevant and worth surveying. One of

the main goals of the research was to generate practical information that people could use to improve their daily lives and to contribute to the general wellbeing of people as well as communities (Mazinga, 2021). This work contributes to the limited body of research on SBAs in ECCE settings. Study participants were clustered as teachers from reception classes attached to public primary schools and were fully funded by the government, reception classes attached to private primary schools and centre bases that were privately owned. Next, I describe how sampling was managed.

4.5.1 Purposive sampling

Purposive sampling is sometimes called judgemental sampling (Sharma, 2017). Purposive sampling is driven by the belief that a rich sample is chosen to provide a comprehensive understanding of the phenomenon (Shaheen *et al.,* 2019). According to Shaheen *et al.* (2019), selecting participants is only achievable following many site inspection trips. The visits help to identify and choose the sample that best suits the goal and purpose of the research.

Shaheen *et al.* (2019) also point out that researchers might use factors like age, gender, experience, functional role or organisation philosophy as a starting point to focus their study's geographic scope. Nhase (2019) affirms that a common goal of qualitative researchers is to make thorough observations at the outset and inspect any elements derived from their perspective rather than the perspective of the participants they are seeing or interviewing. Based on this thinking, purposive sampling was adopted to choose the research locations and the participants for this study.

According to Creswell (2020) and Leedy and Ormrod (2020), purposive sampling involves finding knowledgeable people with profound knowledge and comprehension of the phenomenon being studied. However, there are several limitations to purposive sampling. For instance, it is associated with being open to researcher bias when judgements from the researcher must be better conceived or handled. It can also be difficult to defend the study sample’s representativeness (Sharma, 2017). Lastly, Haward and Berg (2017) note its inability to enable wide generalisability of the findings.

Despite these criticisms, I purposively used my field experiences as an ECCD inspector and my expertise to guide my choice of eight qualified ECCE teachers from five reception classes and three centre bases in rural and urban areas of the Berea district. I used my site inspection trips to locate ECCE settings that best suits the goal and purpose of the research, not taking for granted the highest qualification and the longest experience outlined in the data provided by the Berea education office (see Table 4.1, Section 4.6). The number of participants is in line with arguments in phenomenological research recommending interviews of up to ten people to promote an understanding of the essence of the experience (Creswell *et al.,* 2016). I observed and interviewed eight teachers on the understanding that there was still a high chance of getting rich information because classroom observations and semi-structured interviews would complement one another in this study.

Eight teachers were selected, all of them female. This was likely to happen since only five of the 316 ECCE teachers in the Berea district were male (MoET, 2019). However, I should note that I had intended to work with one male teacher during the proposal development for gender representation in the study. Unfortunately, when the data were gathered, the qualified male teacher was laid off and replaced by an unqualified female. Haward and Berg (2017) maintain that study participants need to represent some experience, phenomena or features that are pertinent to the research question, not the demographics to determine representativeness. In short, sample size selection includes more than the number of research subjects; rather, it is a procedure that combines the number of subjects, the number of interactions with every individual and the duration of the correspondence. Thus, it is important when selecting samples in higher education research that these issues are considered (Omona, 2013).

4.5.2 Convenience sampling

Stratton (2021) says that participant motivation is crucial to the success of qualitative research in convenience sampling. He also warns that participation may be motivated by a desire to reinforce one's particular beliefs or voice a dissatisfied point of view or interest in the study topic. Building on the above discussion, Etikan *et al.* (2016) add that when a target population meets particular practical requirements,

including being easily accessible, living nearby, being available at a specified time, or being eager to participate, they are included in the research through convenience sampling. Owing to its emphasis on accessibility, affordability and easy access to subjects, convenience sampling is widely used (Etikan *et al.,* 2016). It is simpler and less time-consuming than other sampling strategies (Stratton, 2021).

In line with the above discussion, since Berea was my permanent residence and workplace, I conveniently chose local ECCE settings because of their proximity to my place of residence. ECCE teachers were chosen based on their availability at the preschools as permanent MoET employees. Another aspect that I considered was the willingness of these teachers to take part in the research. Hence convenience sampling enabled me as a researcher to access first-hand data and detailed comprehensive descriptions of the strength-based teaching practices used in mathematical play pedagogy from hands-on teachers in ECCE settings.

In summary, purposive and convenience sampling were merged because purposive sampling starts with a predetermined objective. The sample was chosen to contain individuals who were of interest and those accessible to me (Etikan *et al.,* 2016). This implies that as an investigator in this research, I had a purpose in mind and selected participants purposively using my experience; using convenience sampling ensured the accessibility of the study participants. The two sampling techniques were chosen because they complemented each other as non-probability sampling techniques (Creswell, 2020; Leedy & Ormrod, 2020) a researcher employs to choose a subset of units or individuals from the population (Creswell, 2020).

4.6 Schools and Participants' Profiles

The participating schools and teachers were provided with codes to ensure anonymity. The ECCE settings were allocated codes A to H. The letter "T" represented all the teachers who were also designated numbers from one to eight. For instance, for the site allocated code A, the teacher was given number one and is referred to as ATI.

According to the Lesotho Education Act (MoET, 2010), the qualification structure for teachers is under the Minister of Education's Policy Act of 2010 jurisdiction. This regulation states that a four-year university bachelor's degree, an honours degree, a master's degree, or a three-year certificate constitutes a qualified teacher. The three-year diploma comprises the Diploma in Education Secondary and the Diploma in Education Primary. The three-year college certificate comprises the Certificate in Early Childhood Education (CECE), the Primary Teachers' Certificate, and the Secondary Teachers' Certificate (MoET, 2010). The CECE was first launched by the Lesotho College of Education (LCE) in 2007. From 2020, the LCE has provided a three-year, full-time diploma in education, preschool, and Foundation Phase. The first cohort of graduates from this programme graduated in 2023.

In line with the Education Act of 2010, seven teachers were considered qualified and one unqualified at the time of this study. This information was gathered from the Berea Education Office before the beginning of the survey to establish the appropriateness of each participating school. The participants further verified this information during data collection. The information about each teacher is provided in the next section. It is followed by Table 4.1 summarising the participants' age, qualifications and teaching experience, particularly in the reception class for children transitioning to Grade One.

Teacher 1:

This teacher was working in a reception class attached to a public primary school and was fully funded by the government. She was a qualified teacher, aged 47, with 25 years of teaching experience. She was coded AT1. She was a committed and passionate teacher with 10 years of experience teaching children transitioning to Grade One. She has also attended more than 10 capacitating workshops on early childhood programmes.

Teacher 2:

This teacher was teaching in an independently owned and low-fee-based centre in a remote area; she was given BT2 as a code. She was a 49-year-old teacher holding a CECE qualification. She had 17 years of experience as a teacher, of which more

than 10 years were teaching children transitioning to Grade One. She established her preschool without any relevant qualifications, but she eventually developed a passion and enrolled after five years of working with young children. Since she began working with preschool children, she has attended more than four workshops related to ECE.

Teacher 3:

In this group of eight participants, she was also in a low-fee-based centre independently owned in a rural area and was the oldest but the most flexible teacher. She was aged 61 and was coded CT3 for the study. She held a CECE. She had gone further and studied part-time, pursuing other certificates such as the Early Childhood Skills Development Programme and the Certificate in Further Education and Training in Early Childhood Development. She had 24 years of teaching experience and had worked with children transitioning to Grade One for eight years. She also affirmed that she had attended more than 10 workshops for skills development in ECE.

Teacher 4:

Teacher Four was coded DT4 and was from a high-fee-based private setting in town. She was the youngest teacher. She was an unqualified teacher with the least experience of two years in the early childhood fraternity. She replaced the male teacher who was laid off when the data were collected. She notified me as a researcher that since her arrival, she had attended one workshop on material production to make instruction and learning easier in the ECCE setting.

Teacher 5:

Teacher Five was 53 years old. She was teaching in a government-funded school in town. She was the most experienced teacher in the group of eight teachers. She had spent 30 years as a teacher and 17 years teaching the reception class. She was provided with an ET5 code for identification during data collection. She held the CECE and a National Diploma in Foundation Phase. She has attended more than 15 workshops for capacity building in ECE.

Teacher 6:

Teacher 6 was the same age as teacher 1, 47 years. She was in a low-fee-based centre independently managed also in town. She has 20 years' of experience in the classroom and seven years of teaching the reception class. She held a CECE and participated in more than 10 workshops related to early childhood pedagogy. She was coded FT6 for the study.

Teacher 7:

She was also aged 42 in a government-funded and fee-free school in town. She also held a CECE. She had taught for 20 years with 11 years of teaching experience specific to reception classes. She was coded GT7 for data generation and ease of identification. She has also participated in more than 20 workshops on issues about ECE.

Teacher 8:

Teacher 8 was aged 54, teaching in a privately owned and high-fee-based setting in town. Her qualification was the CECE. She was given the code HT8 for data collection. She had 29 years of work experience, with more than 15 years working strictly in the reception class. She highlighted that she had attended more than 20 workshops even though some of the skills she acquired in those workshops were not implemented in her class because, in the private schools, they did things their own way to remain competitive with other nearby private schools.

Table 4.1: Profiles of schools and participants

School code	Status of the school	Participants codes	Participants' qualifications	Participant's age	Participants' years of teaching experience	Participants' teaching experience in reception class
A	Government	AT1	CECE	47	25	10
B	Centre-based	BT2	CECE	49	17	More than 10
C	Centre-based	CT3	CECE	61	24	8
D	Private	DT4	Unqualified	36	2	1

E	Government	ET5	CECE and Diploma	53	30	17
F	Centre-based	FT6	CECE	47	20	7
G	Government	GT7	CECE	42	20	11
H	Private	HT8	CECE	54	29	16

Source: Berea Education Office (2021)

4.7 Data Collection Methods

According to Haward and Berg (2017:12), qualitative findings come from the meanings people give to events and things. This implies that people need qualitative research to understand their lives, and more specifically, qualitative research requires some specialised tools and techniques. A similar opinion is postulated by Leedy and Ormrod (2020) who put it this way: Qualitative research on the methodological front expanded and provided refuge to many aspiring researchers who began to view qualitative work as a feasible mode of inquiry for their areas of interest.

This study used qualitative data collection techniques including direct classroom lesson observations and semi-structured in-person interviews of classroom teachers. Two distinct data collection methods and phases were used, namely classroom lesson observations and then recorded in-person semi-structured interviews. The next sections provide details on the two stages of data collection.

4.7.1 Phase 1: Classroom lesson observations

According to Ritchie (2021), observation is how the researcher sees and hears the events occurring naturally in the research site to develop a detailed understanding of the topic investigated. Yin (2018) defines direct classroom observation as a process of watching interactions and behaviour happening during teaching and learning in the classroom. Reinking (2015) further argues that direct observation is central to understanding classroom practices. The same sentiment is affirmed by the Centre for Disease Control and Prevention (CDCP, 2018), which adds that classroom observations are significant for the gradual professional development of any teacher.

McMillan and Schumacher (2014) explain that in observational studies, the researcher could either be a participant observer (completes the observations and takes part in activities as a regular member of a group) or a non-participant observer (does not participate in activities at all but chiefly observes the happenings). The phenomenon of the research influences the choice of role, the nature of the setting, and the respondents (Creswell, 2020).

In this study, I acted as a non-participant or complete observer. Maree (2020) defines a full observer as a non-obstructive form of observation with the limitation that the researcher is not immersed in the situation. However, I employed it because I did not partake in the class activities or make recommendations about how the participants should deliver instruction or interact with the children. This form of observation was motivated by three reasons: It permitted me a researcher to document each teacher's performance closely; it prevented me from engaging in activities that might have distracted data collection or limited what I saw; and most significantly, I believed that if had opted for participant observation and interacted with children and teachers, I might have influenced their choices about text and impacted the study's validity and trustworthiness (Maree, 2020).

I also developed a lesson observation sheet (see Appendix H) in line with research questions focusing mainly on mathematical play teaching practices and methods used in the ECCE classrooms, children's activities during mathematics lessons, classroom setting and arrangement, and the instructional play resources available and utilised in mathematics play learning in ECCE classrooms. The language of instruction used in all the participating ECCE settings was English, although the Lesotho Education Language Policy (MoET, 2019) stipulated that Sesotho as a mother tongue should be the language of teaching for children in grades zero through three.

This directs our attention to Maree (2020), who claimed that through observations, personal experiences and thoughts, the researcher gains knowledge about how the environment is socially created concerning power dynamics, discourse, language and communication channels. The classroom lesson observations allowed me to see and record how the ECCE teachers interacted with the physical environment, both indoors and outdoors, during mathematics play pedagogy using SBAs. Lesson observations allowed me to witness the human dynamics of teachers in the ECCE classrooms, detect developing themes or patterns of behaviour, capture the essence of the study and develop a broad understanding of the ECCE settings.

Furthermore, I followed various steps in conducting classroom lesson observations in this study. In the first instance and following the planning meeting with each participant before the commencement of the classroom lesson observations, I formed four groups out of eight ECCE settings and organised two sets of observations. I observed each teacher once in the first four weeks of data collection and formed four groups; ATI, BT2, CT3, DT4, ET5, FT6 GT7, HT8 and this constituted set one. Subsequently, the same procedure and criteria were followed to form set two of the classroom lesson observations.

In summary, each teacher was observed twice during phase one of data collection and I took field notes and pictures to record not only what was seen and heard but also the reflection of the occurrences. The field notes informed the probing questions for the in-person semi-structured interviews and were also recycled for data analysis. Figure 4.1 below gives an outline of the classroom lesson observation process.

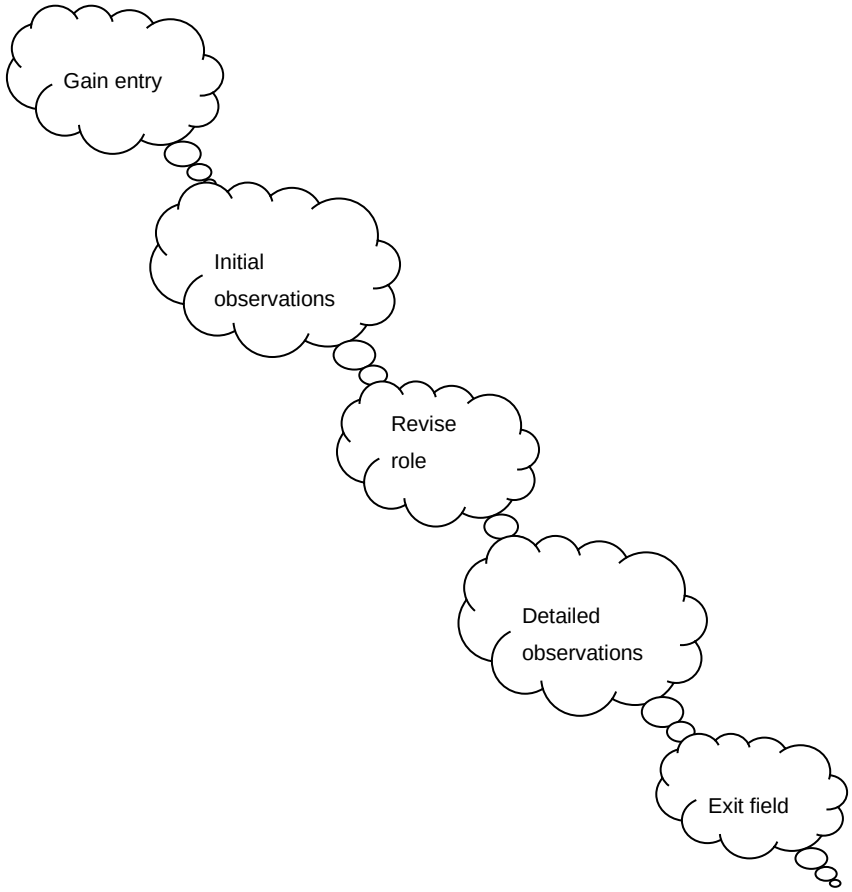

Figure 4.1: Classroom lesson observation process outline (adapted from McMillan & Schumacher, 2014:350)

4.7.2 Phase 2: Semi-structured interviews

Billups (2022) acknowledges the existence of the three most common interview formats: semi-structured, structured and unstructured. Semi-structured interviews are between structured and unstructured interview formats (Billups, 2022; Osborne & Grant-Smith, 2021). According to Cohen *et al.* (2018), semi-structured interviews are a qualitative method of gathering data that maintains a conversation with a purpose. Yin (2018) further indicates that characteristics of semi-structured interviews include a formal interview between the interviewer and interviewee and an interview guide that entails open-ended questions.

DeJonckheere and Vaughn (2019) also draw attention to the ways of conducting engaging semi-structured interviews, which calls for competence in interviewing techniques as well as a relational focus that includes active involvement and inquiry. According to Maree (2020), interviews are intended to provide participants with a firsthand understanding of the world, since they may serve as important information sources.

The in-person, semi-structured, one-on-one interviews were employed in phase two of the data collection process to probe the validity of results revealed by the classroom lesson observations. The interviews elicited teachers' SBAs using play to educate and learn in early mathematics. According to Neuman (2016), direct human contact is the primary strength of face-to-face interviews. Neuman (2016) adds that the absence of in-person interaction impedes the establishment of rapport and natural interaction, both of which are thought to be necessary for producing rich qualitative data.

Similarly, Farooq and de Villiers (2017) believe that face-to-face interviews provide in-depth verbal, nonverbal (face and body language) and contextual information, such as the interviewee's physical attributes and the environment in which the interview was conducted because the researcher meets, sees, talks with, and listens to a respondent. The same sentiment is maintained by Schröder (2016), who noticed that nonverbal clues and small utterances were more important than we may think in continuously forming and directing the conversation during face-to-face interviews.

Finally, the semi-structured interviews were adopted for flexibility and are likely best when the researcher has fairly specific questions in mind (Haward & Berg, 2017). Maree (2020) adds that semi-structured interview schedules define the line of inquiry; researchers need to pay close attention to participant replies to spot newly developing lines of inquiry closely connected to the investigated phenomena. The study interview guide (see Appendix I) had 14 items to address the four main research questions (see Section 1.5.4). For instance, the first research question was answered by the following items: four and five. The second research question was addressed by items six and seven. The third research question was answered by items eight, nine and 10. The last research question was addressed by items 11,12, 13 and 14. DeJonckheere and Vaughn (2019) implement this principle because research questions are powerful study entities related to every design aspect, including the research instruments. The examples in Table 4.2 below match the research questions with some open-ended questions from an interview guide.

Table 4.2: Summary of research questions and interview guide questions

Research questions	**Interview guide questions**
1. What is the understanding of teachers' SBAs supporting mathematical play pedagogy in ECCE settings?	• What are the strength-based practices/approaches in your knowledge? • Which SBAs effectively facilitate playful mathematics learning in your reception class?
2. What are the existing SBAs used to enhance mathematical play pedagogy in ECCE settings?	• In your reception class, what strength-based teaching and learning approaches do you use to engage children in playful learning of mathematics? • Do you think you are adequately trained to teach mathematics through play using SBAs in your reception class?
3. How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?	• Besides the teacher's contribution, do you think the teaching and learning materials are enough to facilitate playful mathematics learning in your

	reception class? • Do you use ready-made or homemade/improvised TLMs or both to facilitate mathematical play pedagogy in your reception class?
4. How can SBAs be strengthened to enhance mathematical play pedagogy in ECCE settings?	• Do you think it is necessary to encourage reception class teachers to strengthen play pedagogy using SBAs to teach mathematics? • Do you have any suggestions for strengthening/improving play pedagogy to enhance mathematics learning using SBAs in the reception classes?

In conducting the interviews in this study, I planned a meeting with each participant to discuss the interview scope and confirm the appointment dates with the participants. Unlike the classroom lesson observations, the one-hour session interviews were conducted at school, and at the end of the school day. This was done to adhere to the MoET's condition that the study activities should not affect teaching and learning. It is worth indicating that each participant was interviewed once, and the interview was audio-recorded with the participant's consent. I interviewed two participants each week following the numbering of the codes (see Section 4.8.1). I started with AT1 and finished with HT8. I followed the same order implemented during classroom observation to maintain consistency and adhere to the logic of the study's data collection events.

Lastly, classroom lesson observations resumed the study's data gathering, and in-person semi-structured interviews followed. This was done purposively because interviews are quite productive when conducted among people the researcher has already seen face-to-face and has already developed a rapport with during fieldwork (Maree, 2020). It would be helpful to remember that semi-structured interviews are criticised for taking a lot of time to recruit for, conduct, and pay travel expenses (Marshall & Gretchen, 2016). However, using semi-structured interviews aims to collect detailed descriptive information to help the researcher comprehend how participants develop their knowledge and sense of social reality (Maree, 2020) and are ideal for allowing for the collection of contextual data (Farooq & de Villiers, 2017). Therefore, semi-structured interviews, audio-recorded for convenience in data

transcription before data analysis, were used in this study to validate data that surfaced from classroom observations.

4.8 Data Transcription

According to Dubey (2021), transcription is taking notes and other information and transforming it into a structure used for analysis. Building on the above definition, McMullin (2023) defines data transcription as the qualitative technique of converting recorded audio material into a written form that can be analysed. He adds that recordings ensure that researchers refrain from relying on their power to recall or scribble notes. A similar opinion is given by Dubey (2021), who highlights that recordings in the form of speech are changed into written form to be studied thoroughly, connected with analytic notes and coded.

Dubey (2021) further indicates that transcription is a complex task because expressing audible talk as written text needs reduction, interpretation and representation skills to make the written text clear and comprehensible. Therefore, it is reasonable to infer that data transcription is a qualitative research project's first and most crucial step leading to data analysis that needs to be done by the researcher as they include some nonverbal cues in the transcript, such as a simple pause for thought or emotion (Maree, 2020).

Summaries were made on the lesson observation sheets during classroom observations. I scheduled one hour of note-taking immediately after observations while important information was still fresh in my memory. Addressing a warning expressed by McMullin (2023), a great deal of time and attention was allocated to transcription. Since the interviews were captured on audio, I used my smartphone and changed the phone settings to enable the audio to play slowly. This allowed me to listen carefully to the recorded material and write it down verbatim. I planned two rounds of data transcription and three copies (two drafts and a final) of each audio. I transcribed each audio and prepared a first draft copy for each participant in the first instance. The transcription took between three and five hours for each participant. I transcribed the interviews in the codes' logical order as they were saved in that order on the smartphone. This constituted round one of data transcription with a draft copy for each participant.

After two weeks I resumed the transcription of the second round following the same procedure as round one. The interval permitted me to rest and forget everything about first-round transcriptions. This was done in line with McMullin (2023), who acknowledges that transcription was a time-consuming and tedious task, requiring three to eight hours to transcribe one hour of audio, depending on one's typing speed. Similarly, in this round, I listened, transcribed word for word, and prepared a second draft for each participant. The two drafts were consolidated to have a final draft used for data analysis. It is essential to note that the draft copies were not destroyed but were kept safely in locked cabinets for future reference in case they were needed. Finally, data analysis followed the data transcription process.

4.9 Data Analysis

According to Maree (2020), data analysis is the interpretive thinking that occurs when scrutinising the meaningful and symbolic content of qualitative data. Vaismoradi and Snelgrove (2019) maintain that qualitative research entails different analytical techniques to produce social descriptions and interpretations of social phenomena that are contextualised and cultural. Creswell (2020) adds that when analysing qualitative data, the researcher aims to provide an overview of what they have observed or heard using recurring terms, phrases, themes or patterns to understand and interpret what emerged during data generation.

According to Vaismoradi and Snelgrove (2019), researchers from different fields frequently employ qualitative analytical techniques of content analysis and thematic analysis. The content analysis identifies and summarises message content (Frechette *et al*., 2020). The thematic analysis cuts across data-seeking themes to describe and interpret data. Hence a theme is considered latent content in both content and thematic analysis approaches (Vaismoradi & Snelgrove, 2019). I employed content and thematic analysis approaches known as thematic content analysis (TCA) to assist in directing the study's data analysis.

This study used TCA to analyse the information gathered via semi-structured interviews and classroom observations once data were generated. According to Anderson (2016), TCA is a qualitative process presented descriptively, fundamental to qualitative analytic procedures. In TCA, the researcher groups and distils a list of

common themes from the texts to express the commonality of voices across participants. In the final step of data analysis, themes or patterns are defined as the data's subjective meaning and culturally contextual message (Creswell, 2020; Vaismoradi & Snelgrove, 2019). The TCA guidelines include familiarisation with data, identifying codes, formulating meanings, grouping themes and subthemes, developing a sense of segments and finally generating a report (Anderson, 2016).

Arranged differently, McMillan and Schumacher (2014) describe the steps as understanding the entire transcription, producing preliminary codes from the data, contrasting codes to check for redundancy, experimenting with their provisional codes and improving their coding scheme. Comparing the two guidelines I adopted Anderson's process and implemented it as a standard for data analysis.

In this study, **social interaction** principles advocated by social constructivism theory (see Section 3.5.3) assisted me as a researcher in understanding and interpreting how interaction, collaboration and learning between children and teachers took place during the lessons using observation sheets to generate data. Similarly, the **ZPD** aspect of the social constructivism theory (see Section 3.5.1) became vivid to me when analysing classroom lesson observations as it highlighted the occurrences in which ECCE teachers significantly supported children during the lessons to pull them to reach their full mathematical potential using SBAs. This means that through the lens of ZPD, I made sense of the teaching practices using observation sheets.

In addition, the influence of **language** (see Section 3.5.4) and **cultural context** (see Section 3.5.5) as components of social constructivism were depicted by the medium of instruction, instructional practices, instructional resources employed and the children's activities outlined in the observation sheets and the semi-structured data transcripts used for data analysis. As a result, TCA enabled me during data analysis to discover how social constructivism principles shaped the ECCE settings investigated, strength-based teaching practices employed and interview feedback yielded. Lastly, the combination of social constructivism and TCA gave me a comprehensive understanding of how learning and interaction occurred in the ECCE settings sampled. Most importantly, TCA assisted me as a researcher in deriving key

themes used for data scrutiny. Table 4.3 below outlines the process followed to analyse data in this study.

Table 4.3: The process that directed the qualitative data analysis

STEPS	ANALYSIS METHOD	AN OUTLINE OF HOW EVERY STEP IN THE STUDY WAS DONE
1	Classroom observation notes and final copies of transcripts of the semi-scheduled interviews were utilised.	The responses were relevant to one of the objectives or research questions. For instance, “teaching practices in which teachers use resources available in their environment”, were considered linked to the first research question.
2	Marked with a highlighter all descriptions that were relevant to the topic investigated.	Different highlighters were used for the relevant descriptions, such as red highlighter for teaching practices and yellow for resources.
3	From the highlighted relevant descriptions, different themes were marked distinctively.	Different themes were separated into pieces, and specific themes were changed where needed. All the information relevant to understanding themes was stored.
4	The overarching **themes** were determined.	Using the keywords from the highlighted descriptions, themes were aligned with the objectives and study questions.
5	There were **categories** created for the themes.	Themes that fit into the designated categories were found. Grouping and regrouping similar and different units and re-labelling categories.

6	The **final** list was created by creating a new list of categories and subheadings.	Similar features among the categories led to a reduction in the total number of categories when they were amalgamated.
7	The list of categories and subheadings was used to go over and reread each transcript while it was being **coded** following these.	At first, I found themes that fit the recently created categories. As a result, the recently established parts were approved and confirmed.

Source: Adapted from Anderson (2007: 3)

The above guidelines were used for both semi-structured interviews and observations. Using TCA I began by organising data to make sense of them and then identified codes from the lesson observation sheets and interviews. These were merged after repeatedly reading the transcripts of the semi-structured interviews, grouping similar codes into themes and subthemes, enabling me to comprehend the participants' descriptions of the SBAs using mathematical play-based pedagogy in ECCE settings. The merging process also allowed me to see teachers' strengths and capacities (for example, creativity in the selection of children's activities) in early mathematics and also the instructional play resources available for play-based pedagogy in ECCE settings.

4.10 Validity, Crystallisation, and Trustworthiness

Validity is defined by Cohen *et al.* (2018) as the degree to which the interpretations provide the participants and the researcher with shared meanings. The authors further indicate that information-gathering strategies, including multi-methods, participant language, low-inference descriptors, multiple researchers and member-checking enhance validity by increasing agreement on the description between the researcher and participants or arrangement of occurrences and particularly on the connotations of the happenings (McMillan & Schumacher, 2014).

Trustworthiness includes credibility, dependability, transferability and confirmability (Kyngäs *et al.* (2020); Norman & King, 2020). Kyngäs *et al.* (2020) argue that trustworthiness, dependability and transferability relate to internal and external validity, while confirmability relates to how data are presented. Maree (2020) adds that trustworthiness is critical to assessing data analysis, findings and conclusions.

Borkan (2022) recommends crystallisation in qualitative studies. This recommendation is motivated by crystallisation's emphasis on reassurance by engaging mentors and guides through multiple methods and member-checking, among others. Qualitative studies signify the absence of a fixed point or object that can be triangulated. Hence the value of crystallisation is on the basis that qualitative research studies aim to probe for a better comprehension of the occurrence and set out to penetrate the human experience and constructions about it (Maree, 2020). Borkan (2022) defines crystallisation as a change of perspective from seeing something as a hard, fixed, two-dimensional item to the concept of crystal, which allows for an unlimited number of forms, materials, transmutations, dimensions and approaches. Therefore, crystallisation in qualitative studies gives researchers a more intricate and thorough comprehension of the phenomena (Maree, 2020) because researchers deal with emergent reality reported and assessed rather than precise, quantitative results.

In this study validity was strengthened through the use of data generation tools (lesson observation sheets and audio-recorded interviews), the mutually agreed upon interpretation of interview questions by me as a researcher and the participants and the data analysis method used to represent participants' reinterpreted understanding of the phenomenon. All the information described in the results was crystallised from the data collected.

Similarly, to strengthen crystallisation, I employed a member-checking strategy that verified my understanding of what to observe. I did member-checking during the planning meeting before the commencement of the lesson observations made in the classroom. The participants were helped to comprehend my focus of the observations (see Section 4.8.1). In addition, I also crystallised observation data with what emerged from interview data by returning to the participants after data analysis.

This was done in agreement with Maree (2020), who argues that researchers need to crystallise observation information that requires comparison with the information that emerged from other data-gathering strategies to maintain trustworthiness.

Finally, peer-checking was also implemented in which I engaged an experienced PhD student awaiting graduation at the time of data analysis to reanalyse some of the data. This principle authenticates Borkan's (2022) belief that member checks are critical for ensuring credibility despite being criticised for validity and reliability. Hence, repeatability is not a crucial property, and therefore, participants should be expected to develop themes that are different from the researchers. This crystallised reality will contribute to credibility because people reading my data and analysis would see the same emerging patterns, which enhances the trustworthiness of my research.

4.11 Researcher's Background

As the project's author, I considered Sithole *et al.*'s (2017) idea to describe my experiences as a girl from a rural background and a primary school teacher for more than 15 years. I also discuss my academic journey as a researcher and the factors that led me to conduct this study.

I am the third child in a family of seven (two boys and five girls). I grew up with my parents and all my other siblings. Since there were five girls, we shared responsibilities in doing family chores, such as cooking, washing and cleaning. The boys were responsible for looking after animals and fetching water.

In terms of my education, I attended the primary level and acquired a Primary School Leaving Certificate (PSLE), the secondary level and obtained a Junior Secondary Certificate, and then high school level and acquired a Cambridge Overseas School Certificate which enabled me to apply for the tertiary level.

Teaching has been a professional career, inspiration, passion, and source of strength for me. I specialise in inclusive education primarily to be able to work across different levels of education, including early childhood. For career development, I

shifted from being a primary teacher to an inspectorate department and became an Inspector at the ECCD for the MoET.

4.12 Researcher's Positionality and Reflexivity

Haimene (2023) maintains that positionality is a prominent element in producing knowledge and necessitates introspection, which is significant for detecting power relations embedded in the research process. Relationships one has with others, how the researcher perceives one's positionality, and how one is perceived by others all have a role (Ozano & Khatri, 2018). Gender, ethnicity, position, and economic status are the variables that affect positionality (Creswell & Creswell, 2018; Holmes, 2020).

Hence, positionality influences the kind of data gathered, how it is collected, and the interpretation of the data (Greene, 2014). An outsider, or someone with no prior knowledge of the community or the subjects of the study, can conduct the research, or an insider from the same social group, organization, or culture (Greene, 2014).

I positioned myself as an outsider and insider in this study since this study was conducted in two phases. In phase one, I positioned myself as an outsider because I needed to understand what was happening in the teaching practices of these teachers when using SBAs. I had to examine their teaching practices objectively to better understand their experiences. On the same note, I positioned myself as an insider in this study. The reason was that we shared a similar language (Sesotho), race (Basotho), gender (females) and occupation (permanent employees of MoET working for ECCD), even though we differed in positions as participants are teachers and the researcher is an inspector.

My responsibilities are to inspect ECCD establishments and train ECCD teachers in all matters of instructing and learning (see Section 1.2). The topic of my study was thus motivated by the achievement of the MoET of the revision of an outdated 1998 ECCD curriculum to create a new Lesotho ECCD Curriculum Guide 2021, which incorporated technology and other emerging issues. The modification was strongly recommended by the Better ELDS workshop held in 2019 as a joint venture between UNICEF Lesotho and the MoET through the ECCD unit.

However, the new curriculum is also grounded in play-based learning similar to the 1998 curriculum. The documents are both rooted in play pedagogy despite the results of the investigation that was done in 2018 which found that not much was understood about play and learning environments in early childhood centres (World Bank, 2018). This also speaks to the findings of the Network of Early Childhood Development of Lesotho (NECDOL, 2020) which affirm that the ECCE institutions play a significant role in providing care and educative environments for young children. This is particularly important currently as families struggle to interact with children under the age of five and to engage them in reading, singing and playing. In fact, very few households, especially in rural areas, have books or play materials.

With this in mind, I became inquisitive and overwhelmed by many questions, such as: What “little” is known about play? Moreover, how do teachers prepare their learning environments if “little” is known by the learning environment, especially when research shows that the learning environment determines good mathematics pedagogy in early educational settings (Gripton & Williams, 2023).

I also wondered why the Lesotho curriculum developers insisted on grounding the new curriculum in play pedagogy, yet little was known about play from the teachers’ perspectives. Furthermore, classroom visits during inspections broadened my insight as a researcher revealing some inconsistent practices (e.g. different numbers of learning corners in the ECCE classrooms) that needed to be understood and addressed by all the practitioners. As a result, exploring SBAs using mathematical play pedagogy shaped my imagination and interest, partially based on personal observations and field experiences.

In this study, my role as a researcher included the facilitation of the data collection process which is a core dimension of a research project. This was an informative and educative journey marked by achievements within the challenges. I maintained truthfulness, transparency, respect, and humility, acknowledging that my area of specialisation academically was neither ECE nor the Foundation Phase. In these circumstances, my relationship with the participants was central to the smooth data generation process. This is signalled by Nhase (2019:85) who affirms that the relationship between the researcher and the participants can be unpredictable and

complex which will inevitably impact the study process. Luckily, my relationship with the participants in this study was harmonious because of my position as an inspector working closely with the participants.

On the other hand, being an inspector in the same district as the participants and as a PhD researcher, power relations influenced the study. It is possible that my participants saw me as a powerful person, as defined by Ozano and Khatri (2018). To address this, I positioned myself as a co-learner during the entire process and negotiated and explained things to my participants. I explained to the participants that we would work together to improve our teaching practices and assure them they should not feel obliged to participate in the study. This means I established rapport and trust with these teachers. I urged them to express themselves without fear or favour and to do so at any time. As a result, the study's goal was conveyed to them during the planning meeting (see section 4.7.1) and before any data were generated.

Lastly, according to Ozano and Khatri (2018), reflexivity is triggered by positionality and how it affects the research process, as I have discussed above concerning negotiating power differentials. This is because the researcher's background influences the study (Creswell, 2014). Thus, in my capacity as a researcher, I had to use the reflective technique to identify and reveal how these circumstances could have affected the study process (Holmes, 2020). During reflexivity, I examined myself and my positionality as part of the research process. This is because the researcher brings their biography and values to the research situation, and participants behave in a particular way in their presence (Cohen *et al.,* 2018). This self-reflection created an open and honest narrative (Creswell & Creswell, 2018) that resonated well with participants and me when we reflected on all the occurrences during phase one of data collection, because at the end of each lesson observation, reflection was made with each participant.

4.13 Practical and Ethical Considerations

According to Kang and Hwang (2021:6), research ethics, including respect for persons, protection of participants, do-no-harm and distributive justice, remains essential in any research: researchers must act morally to ensure the participants' wellbeing. McMillan and Schumacher (2014) opine that understanding the moral and

practical responsibilities of conducting research is significant because most social researchers work with humans. They occasionally need people to provide personal information to strangers. Kang and Hwang (2021) have shown that ethical principles include full information, voluntary involvement, informed consent, no harm, privacy, the use of an institutional review board and professional integrity which remain the duty of the researcher to adhere to so that the study is done ethically.

Within the framework of this research, critical moral concerns were considered. I sought permission to continue this research and adhere to the Code of the University of the Free State of ethical practice in the Faculty of Education Ethics Review Committee. An approval letter was provided (see Appendix A). This was done in line with Rubin (2021) who argues that all universities put a panel of professionals in place to review proposed studies. Permission was also obtained from the Berea Education Office (see Appendix C). Letters granting permission were also obtained from principals (see sample in Appendix D) and informed consent forms were completed and signed by participating teachers (see Appendix F) before conducting this research.

The consent documents ensured that the respondents understood the details of the entire research process before the investigation commenced. The participants were made aware of their right to stop participating in the study at any time (Cohen *et al.,* 2018). The participants' identities were withheld to prevent possible harm. Classroom observation sheets (see Appendix H) were completed anonymously; only I knew and understood the codes. Thereby protecting the participants' identities, and no identities were revealed during semi-structured interviews. More specifically, during the data generation, I ensured that participants' rights were upheld and that they were treated with respect during the data-gathering procedure (Clark-Kazak, 2017). To further ensure secrecy, pseudonyms were used to report the study's results and no one not directly involved in the research was given access to participant data.

The study's aim, objectives, processes and procedures were shared with each participant before the beginning of the research journey. However, despite these precautions, it was clear that not every participant was happy to be involved in the

study. This was evident during round one of classroom observations when some participants seemed very anxious at the beginning of the observations. I thought my senior position as inspector of education was likely to be the reason. Similarly, during interviews, some answers were very short and telephonic giving responses like *"none"* and "*both*". For instance, in responding to item nine of the interview guide, *"Do you use ready-made or homemade/improvised TLMs or both to facilitate mathematical play pedagogy in your reception class?"* some participants simply said *"both"* and I needed to employ my probing skills more. I thought that limited research activity in Lesotho might have contributed to this behaviour.

4.14 Chapter Summary

The chapter described the research design used in this investigation of Lesotho's Berea district. The interpretive paradigm shaped the overall approach, determining an interpretive phenomenological research design in which purposive and convenient sampling methods were employed to identify a sample of eight reception classes, three government-funded, two privately owned, and three centre-based and independently owned. Data were generated using observation sheets and semi-structured interviews from reception class teachers of children transitioning to Grade One. My background and positionality were considered, and other methodological processes were described and justified. These included data transcription and analysis, validity and reliability and ethical protocols. In the next chapter, I present conclusions and outcomes following the data analysis.

CHAPTER FIVE: ANALYSIS, INTEPRETATION, DISCUSSION AND RESULTS

> Despite wide variations in the amount of money allocated to Early Childhood Care and Education, no one strategy has been shown to be a universal model that works for all cultures. (Gyeke-Ampofo *et al*., 2023:82).

5.1 Introduction

The goal of this chapter is to provide an analysis of the data collected to fulfil the study's primary objective of exploring the strength-based approaches using mathematical play pedagogy in Early Childhood Care and Education (ECCE) settings in the Berea district of Lesotho. This study used Thematic Content Analysis (TCA) to analyse data gathered via semi-structured interviews and lesson observations from ECCE teachers. The codes provisioned to participants in Section 4.6 were used in this chapter to protect the participants' identity in accordance with the ethical criteria for the study, which are described in Chapter Four Section 4.13.

The precise research questions that direct this study are presented, with an emphasis on the ways in which children's engagement and knowledge of mathematics were impacted by SBAs. Most crucially, data from observations assisted me in addressing the study's first three research questions while the semi-structured interviews addressed all four research questions below:

What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?

What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?

How do TLMs facilitate mathematical play pedagogy using SBAs in ECCE settings? and

How do SBAs support and strengthened mathematical play pedagogy in ECCE settings?

Thus, the data collection results through the two instruments are presented, analysed, interpreted and discussed in this chapter. The information was analysed in two distinct phases, with lesson observation analysis first, followed by the analysis of the semi-structured interviews. The implications of the findings of both observations and interviews to Lesotho's context are also given at the end of each phase of analysis. The themes are also merged in this chapter, and the overall findings of the study are presented before the summary of the chapter. Next, I present the classroom lesson observations analysis.

5.2 Phase 1: Classroom Lesson Observations

Data from direct classroom observations was collected using a developed observation sheet in line with Reinking (2015), who opined that the observation's instruments should be examined, put into practice, enhanced and adjusted in response to a particular study topic under investigation. Ritchie (2021) added that observation is a fundamental approach and a powerful measuring tool in ECE settings since it allows observation of learning environments and teacher-children interactions. Most importantly, observation is the only method available to administrators, teachers, researchers and data collectors for evaluating early childhood teachers (Reinking, 2015). In this study, the observations focused on teaching practices.

I believe that teaching practices should not be viewed in isolation during teaching and learning but in conjunction with classroom arrangement, instructional resources and children's activities during mathematical learning. Therefore, the themes in the observation sheet included classroom arrangement, teaching and learning materials, children's activities during mathematical learning and teaching practices/methods. A similar opinion is authenticated by Reinking (2015), who postulated that observation of teacher-student interactions in early learning classes should be broken down into three main categories: educational assistance, classroom organisation, and emotional support.

Based on the above inferences, the themes that emerged in this data analysis phase were informed and derived from the foci of the observations that were clearly stated on the observation sheet. This stage involved using Vygotsky's social constructivist

theory to summarise the overall results via the prism of its theoretical ideas, such as the ZPD, mediation, language, social interactions and cultural contexts that informed this study (see Section 3.5). The themes and how they relate to the literature and theoretical framework this study employed are outlined in Table 5.1 below. In analysing the themes, literature and theory shown in this table were used to support or challenge the findings. For instance, the findings of classroom arrangement were supported by the literature and theory stated alongside it.

Table 5.1: Relationship between observation themes, research questions, literature and theory

Themes	**Literature**	**Theoretical Framework**
Research Question 1: What are the teachers' understandings of SBAs that support mathematical play pedagogy in ECCE settings?		
Classroom arrangement	Baroody *et al.* (2019); MoET (2021); Maraisane (2022); MoET (2020); MoET (2020).	How teacher-children interactions in early learning classes are supported by classroom organisation, and instructional support to assist children in realising their greatest potential (ZPD).
Children's activities during mathematical learning	Evans (2021); MacDonald *et al.* (2021); ECMG (2022); Reinking (2015).	How teachers respond to children's play-based abilities and capacities to engage them in mathematics activities. A social constructivist concept is engagement/mediation in the teaching and learning process.
Research Question 2: What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?		
Teaching practices/methods	Galloway *et al.* (2020); MacDonald *et al.* (2021); Ritchie (2021).	How teachers mediate the learning of mathematics through play using SBAs. Social interaction in the ECCE setting is a social constructivist principle highlighted by Vygotsky's theory.

Research Question 3: How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?		
Teaching and learning materials	Frimpong (2021); Maraisane (2022); MoET (2021).	Students engage with one another, with resources, and with the time teachers provide to their development, ultimately informing their ZPD, as Vygotsky (1978) proposed.

I observed and photographed all the lessons the eight participant teachers taught in this investigative phase. I observed two lessons taught by each teacher during phase one of data collection. In the first four weeks, two ECCE settings were observed each week. This implies that I observed each teacher once in the first four weeks and formed four groups: (ATI, BT2), (CT3, DT4), (ET5, FT6) and (GT7, HT8) and this constituted set one. Secondly, the same procedure and criterion were followed to form set two of the classroom lesson observations.

Sixteen observed lessons were used in this investigation. To analyse data from this phase, I used the notes recorded on the lesson observation sheets for set two of the observations. Set two data was considered for analysis primarily because I identified the in-depth particulars (teaching practices) during observations and became attuned to my role as required for set two through the preliminary data gathered during set one (see Section 4.8.1). I highlighted the lesson objectives for the set two lessons observed because they guided the observations findings analysed in this phase. Hence, Table 5.2 below summarises the lesson objectives of the eight lessons of set two used for data analysis. The dark yellow highlighted objectives in each lesson were for mathematics as the focus area of this study.

Table 5.2: Set two summaries of lesson objectives observed from eight participants

Teacher's codes	Lesson title	Lesson objectives
AT1	My family	• Name three family members and say their roles. • Recognise number three from other numbers. • Recognise the letter sound "a" from other letters.
BT2	The flag of Lesotho	• Identify four colours of the Lesotho national flag. • Say the meanings of each of the four colours in the flag. • Count four colours of the national flag.
CT3	Introducing oneself	• Introduce oneself with a name and surname. • Match two objects with a number two. • Sound the number two correctly after identification.
DT4	Myself	• Name their genders. • Point out three objects. • Mention words with the letter sound "e".
ET5	Introducing oneself	• Introduce with a name, surname and gender. • Identify the number three from a set of numbers. • Name their three family members.
FT6	My body (sub-theme: face)	• Name five parts of the face and say their uses. • Count from one to 10 logically. • Pronounce the letter sound "c" correctly.
GT7	Environment (sub-theme: safety)	• Name four harmful objects in the environment. • Identify number four from other numbers. • Mention harmful objects with the sound "t".
HT8	Rote counting	• Read five vowels: a, e, i, o, u. • Count from one to five orderly. • Join five dots to make a horse.

As already highlighted in Section 4.8.1, I acted as a non-participant observer during lesson observations (Cohen *et al*., 2018). My role was to generate data and ensure the collection process ran accordingly. As stated in Section 4.5, the respondents were teachers from reception classes attached to public primary schools that are fully government-funded, reception classes attached to private primary schools, and independent centres that are also privately owned. Thus, I present data from three government and non-fee-based ECCE settings (AT1, ET5 & GT7), two privately owned and high-fee-based ECCE settings (DT4 & HT8) and three (BT2, CT3 & FT6) independently owned and low-fee-based ECCE settings (see Table 4.1).

In the Lesotho education system, ECCE settings are categorised by the school's fee structure, whereby parents may choose whether to assist with their children's tuition. AT1, ET5 and GT7 worked in government entities and were more qualified, resourceful and experienced than all other participants. For instance, ET5 had more experience (30 years of teaching experience) and had CECE and Diploma in Foundation Phase qualifications, AT1 had 25 years of experience as a teacher, and GT7 had 20 years of expertise in the classroom. Therefore, it is reasonable to infer that they accurately picture where Lesotho's education in early childhood comes from and where it is going. The participants from the independent centres, BT2, CT3 and FT6, were also qualified but less experienced (10, 24 and 20 years, respectively) than AT1, ET5, and GT7. For privately owned settings, DT4 was the least experienced (two years of teaching experience) and unqualified but HT8 has 29 years of teaching experience and is qualified. The following sections offer a thorough presentation of data from classroom lesson observations across the four themes: classroom arrangement, TLMs, children's activities during mathematical learning, and teaching practices/methods.

5.2.1 Classroom arrangement

Classroom arrangement in this context refers to organising equipment and TLMs using learning corners in the ECCE classrooms so children can use them efficiently and effectively during teaching and learning. According to the MoET (2021), the environment and play are essential elements that support each other in the integrated play-based learning approach advocated by the Lesotho ECCD

curriculum. The Curriculum Guide further advocates a balance of child-adult involvement in play pedagogy and that games, supervised play, unstructured play, and direct teaching be interwoven throughout the programme's daily schedule, routines, environment and learning experiences (MoET, 2021).

Similarly, Maraisane (2022) acknowledges that the Lesotho ECCD syllabus comprises three learning areas: literacy (Sesotho and English), numeracy, and life skills (see Section 2.3). Therefore, six integrated and theme-based learning corners/areas are compulsory in the Lesotho ECCE settings. The MoET (2020) defines a learning corner as a specific location where TLMs are placed and organised in a classroom. The learning corners include literacy, numeracy, art, fantasy, library, discovery, and block, allowing children to explore, learn and play safely.

Most significantly, it is also mandatory that all learning corners should relate to the topic/theme of the day and allow free movement during free play and exploration (MoET, 2020). As a result, six learning corners arranged thematically were expected in the eight ECCE settings sampled in this study. The learning corners assisted me in discovering whether play was incorporated into the teaching practices used in each ECCE settings. The following subsections give the results of the classroom arrangement in the eight participating ECCE settings.

5.2.1.1 Teacher 1 (AT1)

Teacher AT1 classroom had six learning corners thematically arranged. The classroom was spacious enough to fit in six learning corners and allowed free movement for children during learning and exploration at the corners. The pictures below (Figure 5.1) show the classroom arrangement.

Figure 5.1: AT1's classroom arrangement

5.2.1.2 Teacher 2 (BT2)

Even though the classroom was small, six learning corners were displayed with materials related to the day's topic but were never used during teaching and learning due to limited space. The pictures below (Figure 5.2) show some of these learning areas.

Figure 5.2: BT2's classroom arrangement

5.2.1.3 Teacher 3 (CT3)

In her spacious classroom, six learning corners were shown appropriately to allow free movement and play. Most interestingly, the classroom floor was covered with blankets to enable play in the learning corners. The above evidence is shown in the pictures below (Figure 5.3).

Figure 5.3: CT3's classroom arrangement

5.2.1.4 Teacher 4 (DT4)

DT4 classroom was crowded. There were 55 children in the class during the observations. The teacher indicated that the class is allocated two teachers, although I found one teacher for the three visits (plenary meeting and two observations). According to the MoET (2013), the recommended teacher-child ratio in reception classes is one to 30 (1:30). I discovered that they have two classrooms. However, learning corners were absent in both classrooms. One class had tables, chairs, a board and a chart on the wall. The floor of this classroom was slippery. The other class had a mat, board and teacher's desk. Below are the pictures of the two classrooms (Figure 5.4).

Class A **Class B**

Figure 5.4: DT4's classroom arrangement

5.2.1.5 Teacher 5 (ET5)

Teacher ET5 has six learning corners displayed thematically in her class. Furthermore, her vast experience is portrayed in her fantasy corner, which has an

improvised (homemade) television. As a researcher, I learnt that her class is considered a model reception class for the ECCE settings around it. The following pictures were captured to verify the information (Figure 5.5).

Figure 5.5: ET5's classroom arrangement

5.2.1.6 Teacher 6 (FT6)

In this setting, six learning corners were evident (Figure 5.6). Like BT2 with limited space, the theme-based learning corners could have been used more effectively during teaching and learning. Another similar aspect to BT2 was the inclusion of children not transitioning to Grade One. Likewise, CT3 had the floor covered with blankets and FT6 had a mat.

Figure 5.6: FT6's classroom arrangement

5.2.1.7 Teacher 7 (GT7)

Figure 5.7: GT7's classroom arrangement in Class A

Figures 5.7 and 5.8 exemplify the uniqueness of GT7's setting, which had two separate classes. One classroom (Figure 5.7) was fully furnished and had some learning corners, while the other (Figure 5.8) displayed learning corners thematically. I discovered the children shifted to the class with the learning corners during free play. The pictures below demonstrate the six learning corners that were thematically displayed in classroom B of GT7.

Figure 5.8: GT7's classroom arrangement in classroom B

5.2.1.8 Teacher 8 (HT8)

In this sizable setting, six learning corners were arranged with an appropriate display of materials. Surprisingly, the learning corners were not used during teaching and learning. I learnt from the participant that the corners are displayed only because the

inspectors from the MoET need them to be shown. She further indicated that the corners are not used at all. The pictures below show an arrangement.

Figure 5.9: HT8's classroom arrangement

5.2.1.9 Summary of data on classroom arrangement

In line with the above information, it can be concluded that most (six out of eight) ECCE classrooms were arranged using six learning corners encouraged by the Lesotho ECCE syllabus (MoET, 2020). Although the findings revealed that the six learning corners were arranged thematically, it was also discovered that some participants (BT2, FT6, and HT8) did not use the learning corners for various reasons. For instance, BT2 and FT6 were restricted by the limited space, while HT8 arranged the learning corners primarily to meet the ministry's requirements. Lastly, I noticed that one (DT4) of the eight study participants did not comply with this expectation outlined in Section 5.2.1.4. I believe her lack of experience and knowledge accounted for this as DT4 was underqualified and had the least experience. Therefore, I can conclude that overall, the classroom arrangements in the participating ECCE settings were appropriate and in line with the curriculum and the ministry's mandates. Below, I provide the details regarding the above inference.

- ***Thematic learning corners: Compliance with ECCE Syllabus (MoET, 2020)***

The fact that six out of eight ECCE classrooms were arranged according to the six learning corners suggested in the Lesotho ECCE syllabus (MoET, 2020) indicates a high degree of adherence to the official curriculum. According to Trundle and Smith (2017), the arrangement of learning corners within a classroom is an important pedagogical strategy in early childhood education, as it fosters an environment of

exploration, creativity and self-directed learning. These thematic corners might include spaces dedicated to literacy, numeracy, arts, science, dramatic play and sensory activities, all designed to engage young children in various forms of learning (MoET, 2020). This finding highlights the importance of **curriculum implementation** and **pedagogical consistency** in early childhood education (Haile & Mohammed, 2017). It points to the alignment of classroom practice with national educational policies, which are essential for creating equitable and standardised learning experiences across different settings. Moreover, the use of learning corners reflects a commitment to **child-centred education** (Kalpana, 2014), where the environment is structured to support the developmental needs of children.

- ***Reasons for non-compliance with learning corner arrangement***

While many classrooms adhered to the expected arrangement, there were exceptions where participants (BT2, FT6, and HT8) faced challenges that prevented them from fully utilising the learning corners. BT2 and FT6 were restricted by limited space. Space constraints in ECCE settings are a common issue in many developing contexts and they can have a significant impact on the types of activities that can be facilitated. In smaller classrooms, teachers may struggle to organise the physical environment in a way that accommodates distinct learning zones or provides ample space for children to move and engage in various activities. This reflects the physical infrastructure challenges that are often present in educational settings (Solare-Rojas *et al.,* 2022), especially in developing countries. The limited availability of resources, including space, can hinder the implementation of curricula that require more extensive classroom configurations or diverse learning materials (MoET, 2021). The challenge of space management speaks to broader concerns of **resource allocation** and the need for **systemic improvements in educational infrastructure** to ensure that teaching and learning conditions meet pedagogical standards (Diale & Sewagegn, 2021).

HT8's arrangement of the learning corners appeared to be motivated more by a desire to meet the ministry's requirements than by a genuine commitment to implementing a pedagogy that aligns with the curriculum. This suggests that the setup might have been more superficial or compliance-driven rather than driven by

the pedagogical intentions behind the curriculum's design. This finding touches upon the problem of **teacher agency** and **curriculum fidelity**. Teachers may sometimes comply with curriculum mandates due to external pressures such as inspection or evaluation, even if they do not fully understand or believe in the pedagogical efficacy of those practices. This points to a gap between policy expectations and classroom reality, highlighting the importance of providing professional development that helps teachers understand the underlying principles of curriculum requirements, rather than simply focusing on compliance.

- ***Lack of compliance by DT4***

DT4 was the only participant who did not comply with the arrangement of the six learning corners, which appears to be related to her lack of experience and underqualification. According to the data, DT4 had the least experience among the study participants, which could have contributed to her failure to implement the expected classroom arrangement. This finding suggests that teacher qualification and experience play a critical role in the successful implementation of curriculum standards (Feza, 2016). This situation underscores the importance of teacher training and professional development in ECCE. New or underqualified teachers, like DT4, may struggle to apply curriculum expectations effectively, not due to lack of effort, but because they have not yet developed the necessary skills or understanding to navigate the complexities of classroom management and pedagogical design. It also highlights the role of mentorship and ongoing support in helping less experienced teachers build their confidence and expertise, which ultimately benefits the learning experiences of children.

- ***General conclusion: Curriculum alignment and classroom arrangement***

Despite the challenges faced by a few participants, the overall conclusion is that the classroom arrangements in the participating ECCE settings were appropriate and in line with the curriculum and ministry’s mandates. This suggests that most teachers were able to effectively integrate the thematic learning corners into their classrooms, thereby promoting an educational environment that aligns with national expectations for early childhood education (MoET, 2021). This conclusion reinforces the significance of curriculum adherence as a means of ensuring consistency and quality

in educational provision (ECMG, 2022). It also speaks to the broader issue of policy implementation – how well government-mandated practices are translated into real-world teaching contexts. In this case, despite certain constraints like limited space and teacher experience, the overarching aim of aligning classroom practices with the ECCE syllabus was largely achieved.

In conclusion, the data highlights both strengths and challenges in the implementation of the ECCE curriculum in Lesotho. On the one hand, most teachers successfully adapted their classroom arrangements in line with the six thematic learning corners outlined by the Ministry of Education and Training. On the other hand, issues related to limited space, teacher experience, and compliance-driven practices reveal persistent barriers to full curriculum implementation. These findings suggest the need for **targeted interventions in teacher professional development, infrastructure enhancement,** and **curriculum support** to ensure that ECCE practices align with policy expectations and ultimately contribute to high-quality early childhood education outcomes.

5.2.2 Teaching and learning materials

In this research, TLMs refer to the teaching aids (toys, puzzles, flashcards, posters, crayons, etc.) that facilitate teaching instruction in the ECCE settings. Maraisane (2022) highlights the importance of TLMs by clarifying that they influence what children learn, how well they learn and the calibre of teachers' pedagogical approaches and assessment strategies. Frimpong (2021) advocates quality ECE through social constructivism (the theoretical framework of this study). This would ensure children have access to and engagement with TLMs before and during sessions so the intended teaching and learning objectives can be met effectively. Hence, I considered it significant to explore SBAs in ECCE settings regarding available and used TLMs to respond to the study's third research question, *"How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?"*

In the context of Lesotho, it is a requirement to furnish the six learning corners discussed in Section 5.2.1 with play-based TLMs to cater to a play-based pedagogy advocated by the Lesotho ECCE curriculum (MoET, 2021). Therefore, the learning

corners were expected to have TLMs related to the day's topic. The following sub-section gives a detailed insight into what I found in the participating ECCE settings regarding TLMs.

5.2.2.1 Teacher (AT1)

As AT1, ET5 and GT7 taught in government-funded ECCE settings, TLMs were available and employed. Both ready-made and homemade TLMs were evident. I discovered that the government supplied the ready-made TLMs and the homemade ones were made by the parents. The following pictures (Figure 5.10) show the array of TLMs.

Figure 5.10: AT1's TLMs in learning corners

5.2.2.2 Teacher 2 (BT2)

Unlike AT1, BT2 taught in a low-fee-based, independently managed setting and more homemade TLMs were available in this classroom. I learnt that the teacher engaged parents in developing the TLMs. The commitment to TLM development was seen with the six learning corners resourced and arranged thematically in this setting. The teacher revealed that World Vision Lesotho gave them the books, so their library corner was well-resourced. Below are the pictures that describe the scene (Figure 5.11).

Figure 5.11: BT2's TLMs in learning corners

5.2.2.3 Teacher 3 (CT3)

Like BT2, CT3 was in a low-fee-based ECCE setting and many TLMs were improvised creatively. This is shown by the creativity seen in some of the TLMs. For example, each corner is fitted with age-appropriate chairs made of trees and the fantasy corner has a shop where bread flour looks like the product. Furthermore, the art corner had improvised watering cans made of containers. There were very few ready-made materials in this setting. I noted that the ready-made materials were donated to this ECCE setting by a local Non-Governmental Organisation (NGO) enthusiastic about early learning. The pictures below show in more detail the improvised materials (Figure 5.12).

Figure 5.12: CT3's TLMs in learning corners

5.2.2.4 Teacher 4 (DT4)

As highlighted in Section 5.2.1.4, DT4 needed more experience and even in this high fee setting TLMs were minimal. The ones that were there, for example, the posters on the walls, were too high for the children to see the print on them. The most worrisome point was that the teacher indicated that she had attended a workshop

about material development (see Section 4.7). The pictures below authenticate the findings (Figure 5.13).

Figure 5.13: DT4's TLMs in the classroom

5.2.2.5 Teacher 5 (ET5)

ET5 taught in a government entity fully funded like AT1 and GT7 so TLMs were available and seen to be used. I rated this setting as the most resourced after GT7. This ranking was confirmed by the following pictures taken during observations. It is also worth indicating that ready-made and homemade TLMs were in place in this ECCE setting (Figure 5.14).

Figure 5.14: ET5's TLMs in learning corners

5.2.2.6 Teacher 6 (FT6)

Like BT2 and CT3, FT6 mainly improvised TLMs with parents' help. Even though the participant never mentioned any support from outside, like her colleagues (BT2 and CT3), her library corner had books that seemed to be in use (Figure 5.15).

Figure 5.15: FT6's TLMs in learning corners

5.2.2.7 Teacher 7 (GT7)

Though ATI, ET5 and GT7 all taught in government-funded settings, GT7's setting was unique as the building and furnishings were donor-funded and this extended to the TLMs. Both the government and development partners provide the TLMs in this ECCE setting. As a result, many TLMs available are ready-made, while very few are homemade. The below pictures illustrate this (Figure 5.16).

Figure 5.16: GT7's TLMs in learning corners

5.2.2.8 Teacher 8 (HT8)

Even though most parents pay the high fees in this ECCE setting, more than in the other eight settings, few TLMs, ready-made and homemade, were evident. I discovered that because they are privately owned and receive regular fees, there is no provision of TLMs by the government or NGOs. The same experience applies to

DT4's setting. I also learnt from the teacher that parents are reluctant to produce materials because they are too busy. The pictures show the availability of TLMs in this context (Figure 5.17).

Figure 5.17: HT8's TLMs in learning corners

5.2.2.9 Summary of data on TLMs

Based on the above inferences, it can be concluded that ready-made and homemade TLMs were available in many ECCE settings that participated in this study. TLMs were insignificant in only one (DT4) ECCE setting. However, evidence revealed that the government-funded ECCE settings (AT1, ET5, and GT7) were advantaged by having more TLMs because the government supplied them. It was also observed that there was no supply of TLMs by the government to privately owned (BT2, CT3, DT4, FT6, and HT8) ECCE settings, which contributed to their being under-resourced compared to government-funded ECCE settings. Nonetheless, BT2 and CT3 mentioned a supply of TLMs by the NGOs interested in early learning. The findings have also highlighted that highly paid (DT4 and HT8) ECCE settings are less resourced than all the settings that participated in this study due to a lack of parental engagement. Next, I provide an analytic depth of the above findings.

- ***Availability of ready-made and homemade TLMs***

The study shows that many ECCE settings had a combination of ready-made and homemade TLMs. These materials are crucial for supporting young children's learning, providing sensory, tactile, and visual aids that enhance engagement and

understanding in early childhood education. This correlates with the findings of Frimpong (2021), authenticating that playful learning using TLMs encompasses children's involvement, thinking, and integration of a broad spectrum of creative, intellectual, athletic, and social skills to support children's ZPD outlined in Section 3.6.1. The fact that these materials were available in many settings suggests that teachers were making an effort to ensure resources were provided, possibly due to their perceived impact on children's engagement (Ramani *et al.,* 2019) and learning outcomes (Vogt *et al.,* 2018)**.** This finding ties into the theme of **resourcefulness in education**. Early childhood teachers often need to be innovative and creative in ensuring that learning materials are accessible, particularly in resource-constrained settings. This speaks to the social constructivism theory used in this study acknowledging that children engage with one another, with resources, and with the time teachers provide to their development, ultimately informing children's ZPD proposed by Vygotsky (1978).

The use of both ready-made and homemade materials speaks to the adaptability and resourcefulness of teachers in creating effective learning environments for young children. Most significantly, the presence of homemade TLMs symbolises **culturally relevant pedagogy** integrating cultural perspectives outlined in Section 3.6.5 and materials into teaching to reflect and honour the backgrounds of all children. This concept authenticates Lee (2015), who opined that teachers' use of cultural resources or tools in the classroom reveals a great deal about their familiarity with their children's backgrounds including culture. In addition, it aligns with the broader theme of **teaching quality** and how the availability of appropriate materials impacts learning outcomes.

- ***Disparities in TLMs availability: Government against private settings***

The data also revealed that government-funded ECCE settings (AT1, ET5, and GT7) have a clear advantage when it comes to the availability of TLMs which are supplied by the government. This suggests that government funding plays a significant role in ensuring that resources are provided to ECCE settings, making them better resourced than their privately owned counterparts. In contrast, privately owned ECCE settings (BT2, CT3, DT4, FT6, and HT8) lacked government-provided TLMs**.**

This discrepancy suggests that private settings may be under-resourced or less prioritised in terms of government support, potentially leading to inequities in the quality of education provided. However, there was some variation even within the privately owned settings. For example, BT2 and CT3 received TLMs from NGOs focused on early learning. This highlights the important role of NGOs in filling gaps in resource provision, particularly in private settings.

This finding underscores the theme of **inequality in educational resources**. The disparity between government-funded and private ECCE settings reveals a key concern of resource allocation in early childhood education. The government's role in ensuring equitable distribution of resources is crucial, but private settings may be left to rely on external funding sources like NGOs, which can result in variability in resource availability. This highlights broader concerns of **education equity** and **public-private disparities** in **educational access and quality**.

- ***Impact of parental engagement on TLM availability***

Data also points out an interesting observation regarding the role of parental engagement in resource provision, particularly in the case of DT4 and HT8, which were described as highly paid settings but still lacked sufficient resources due to a lack of parental engagement. High fees often correlate with a perception of financial stability, but in these settings, the lack of involvement from parents meant that the schools did not receive the additional material support (such as donations, involvement in classroom activities, or provision of resources) that might have been expected. In contrast, other settings may have benefitted from strong parent-school partnerships advocated by Swart *et al*. (2016)**,** which facilitated resource-sharing.

This finding brings attention to the theme of **community involvement** and its importance in **educational resource mobilisation.** Parental engagement plays a pivotal role in fostering a supportive learning environment, not only through involvement in school activities but also in helping to provide additional resources. This resonates with parent empowerment theories, which see parents as partners and experts on their children (Swart *et al*., 2016). The lack of such engagement in

highly paid settings may indicate a disconnection between the expectations placed on parents in fee-paying environments and the actual support provided to the school.

In addition, this highlights the broader theme of **socioeconomic factors influencing educational experiences**. High-fee settings, which might be perceived as well-resourced due to the fees collected, still face challenges in providing adequate resources without active community or parental support. This suggests that financial contributions alone do not guarantee a better educational experience if the school community is not actively engaged.

- ***Resource disparities between government-funded and privately owned settings***

The key takeaway from this analysis is the significant disparity between government-funded and privately owned ECCE settings in terms of TLM availability. The government-funded settings were better resourced because of direct government provision of materials, while privately owned settings, particularly those without strong NGO support, were disadvantaged in this respect. These government-funded settings (AT1, ET5, and GT7) benefit from state-funded resources, ensuring that TLMs are consistently available. This is particularly important in the context of equitable access to quality education (United Nations, 2020)**.** The privately owned (BT2, CT3, DT4, FT6, HT8) settings often struggle with fewer resources due to the absence of government support and may rely on external sources like NGOs. However, as mentioned, this external support is not always guaranteed and may not be evenly distributed among all private settings.

The disparity in resources between public and private settings underscores the problems of equity and fairness in education advocated by the United Nations (2020). Public education, funded by the government, tends to provide more uniform access to resources, while private institutions may face greater financial limitations, especially if they cannot depend on external funding or parental contributions. This raises important questions about the responsibility of the state to ensure that all children, regardless of the type of school they attend, have access to adequate educational resources.

To sum up, the findings highlighted the importance of equitable access to resources in ECE, pointing to disparities based on ownership (government against private), funding sources, and parental engagement. Ensuring that all ECCE settings, regardless of their funding model, have access to adequate teaching and learning materials is crucial for promoting quality education. Moreover, it emphasises the need for stronger community engagement**,** more equitable resource distribution**,** and greater collaboration between government, parents, and NGOs to bridge the gap between under-resourced and well-resourced ECCE settings. These factors are essential in addressing disparities and ensuring that all children, regardless of their school setting, have access to the learning materials necessary for their development.

5.2.3 Children's activities during mathematical learning

In this case, children's mathematical activities denote children's actions performed in the classroom to achieve the lesson objectives under the teacher's guidance. Evans (2021) maintained that children learn differently, and math lessons should include chances for practical application. The ECMG (2022) added that children require time to choose activities to demonstrate a playful display of their mathematical thinking and knowledge. Justifying this idea further, Evans (2021) highlighted that if play is oriented around mathematical concepts and is led by the child, teachers may enrich it by tailoring activities and assisting with materials, ideas and questions to leverage when discussing new concepts.

In line with these opinions, I explored SBAs using mathematical play pedagogy in ECCE settings by studying children's activities during mathematical learning to verify compliance with the Lesotho ECCD curriculum 2021 – which advocates play-based teaching and learning in Lesotho ECCE settings (MoET, 2021) – and observing whether children's strengths, capacities and talents were accommodated during the lessons. Most importantly, as a researcher, I believe that SBAs cannot be viewed separately from children's activities during teaching and learning because children's activities reveal teaching practices. This view is authenticated by Reinking (2015), who opined that teacher-student interactions in early learning classes are enriched by instructional support. Therefore, children's activities were explored per the

mathematical lesson objectives stated in Table 5.2, highlighted in dark yellow. Below are the findings regarding children's activities.

5.2.3.1 Teacher 1 (AT1)

In this setting, the lesson objective was to "*recognise the number three from other numbers.*" The activities the teacher prepared and performed with the children were playfully engaging. For instance, in one activity, children had to pick the number three from the number cards placed on the floor and stick the picked number on the board. Play was also evident in the learning corners. Therefore, it can be concluded that children's activities in this ECCE setting were playful, as recommended by the curriculum. Below are some pictures showing one activity (Figure 5.18).

Figure 5.18: Children's mathematical activities in AT1's classroom

5.2.3.2 Teacher 2 (BT2)

BT2's lesson objective was to "*count four national flag colours.*" The teacher prepared indoor and outdoor activities for this lesson even though the learning corners in the classroom were not used due to limited space. The indoor activities included counting by pointing to the national flag's four colours. From there, the children located the number four in the classroom and placed a bottle top numbered four wherever they saw the number four. Similarly, outdoor physical activity for gross motor muscles was prepared for the children in which they had to step on and off four tyres four times. The successful step (fourth step) was confirmed as a win. The activities appealed to the children's senses and involved much play. Pictures are provided below to show what happened (Figure 5.19).

Figure 5.19: Children's mathematical activities in BT2's classroom

5.2.3.3 Teacher 3 (CT3)

Teacher CT3 intended to "*match two objects with the number two*" (see Table 5.2). The play-based activities done by children in this ECCE setting included finger tracing the number two on the flashcards, matching two of the same items in different learning corners and identifying the number two on the number charts. The learning corners were arranged to enable children to perform activities regarding 'two' as the number of the day. Even though CT3's setting had more improvised TLMs, I observed that children effectively used these. As a result, play activities were seen in this setting. The pictures below illustrate the above activities (Figure 5.20).

Figure 5.20: Children's mathematical activities in CT3's classroom

5.2.3.4 Teacher 4 (DT4)

As shown in Table 5.2, DT4 wanted children to *"point out three objects"* at the end of the lesson. Striving to attain her lesson objective, the lesson plan stated the following activities: pictures showing the gender of three people, clapping hands three times, collecting three stones outside and bringing them inside the classroom. But as I was

watching, I saw different activities that went against the plan. There were no pictures shown to the children. Instead, three children (two boys and a girl) were called to the front to introduce the number three. In other activities, the teacher demonstrated clapping hands three times, raising three fingers and collecting three stones. The activities tailored to facilitate the achievement of the stated objective were few. There were no learning corners arranged. As a result, no play was evident in this setting. The pictures below give more detail (Figure 5.21).

Figure 5.21: Children's mathematical activities in DT4's classroom

5.2.3.5 Teacher 5 (ET5)

Like AT1 with number identification, ET5 also asked her children to *"identify a number three from a set of numbers."* The following are some of the activities outlined in the plan: placing bottle tops numbered one to 10 on the floor and then placing sticks against each number; thereafter, children are called to identify the number three from the numbers placed on the floor. Children took turns identifying the number three in the learning corners as well. Children in most learning corners imitated the activity as the teacher introduced it. That is, identifying the number, putting items on the same number, and taking turns looking for the number three. Children were playfully engaged in different ways at various learning corners. Below are the pictures to show the activity (Figure 5.22).

Figure 5.22: Children's mathematical activities in ET5's classroom

5.2.3.6 Teacher 6 (FT6)

FT6's topic was "my body," and her specific mathematical objective was to *"count from one to 10 orderly.*" The teacher engaged the children in the following activity to achieve this objective. Each child was given a container with 10 items. The teacher placed number cards randomly from one to 10 on the mat. Children were asked to pick any number on the mat and take out the same number of items from their containers as the number they had chosen. Children took turns doing this activity. The pictures show learners engaged in this activity (Figure 5.23).

Figure 5.23: Children's mathematical activities in FT6's classroom

5.2.3.7 Teacher 7 (GT7)

Unlike AT1 and ET5, GT7 aimed to identify the number four instead of three. Below are some activities that helped achieve the stated objective in this setting. Children had to say the number four in English and Sesotho, point to the number four around the class, mention four objects around the class, and practise writing the number

four on paper. I discovered that during classroom observations, there was an oversight and no pictures were taken at the time of the activities. As a result, I considered it vital to attach a snapshot of the mathematics activities reflected in the lesson plan for verification highlighted in yellow (Figure 5.24).

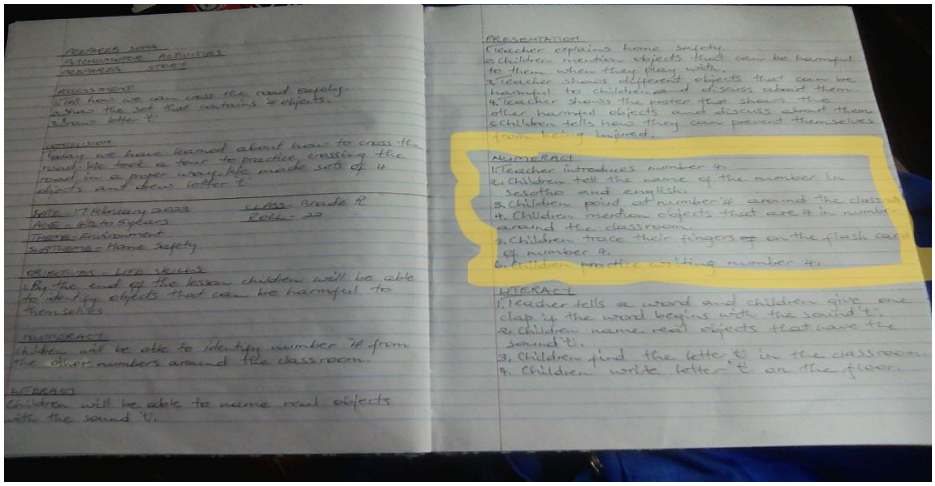

Figure 5.24: Children's mathematical activities in GT7's classroom as per lesson plan

5.2.3.8 Teacher 8 (HT8)

Like FT6, HT8 through rote counting wanted the children to "*count from one to five orderly"* (see Table 5.2). To achieve this objective, the teacher's and children's activities included showing the number five with a hand and counting fingers with the children. Children took turns counting fingers. The children sang a song about five bottles and then put those bottles on the table. Children were then given papers with five dots and asked to count them, join them, and colour them to make a horse. No activities were organised for the learning corners, as the teacher highlighted to me that the corners were there to show the ministry's officials. An outdoor activity was also prepared in which children were asked to form groups according to the numbers called by the teacher from one to five. The pictures below illustrate some of the activities performed (Figure 5.25).

Figure 5.25: Children's mathematical activities in HT8's classroom

5.2.3.9 Summary of data on children's mathematical activities

In line with the above discussion about children's mathematical activities in the ECCE settings in this study, seven of the eight teachers engaged children in different playful activities depending on each teacher's creativity. It is also significant to highlight that the prepared children's activities appealed to the children's senses and went according to plan. However, a different scenario was observed in DT4's classroom, where planned activities differed from those observed. I believe the reason may be that the teacher was unqualified and less experienced (see Table 4.1). Below, I unpack the above findings.

- ***Engagement in playful mathematics activities: Teacher creativity and children's engagement***

The data reveals that seven out of eight teachers engaged children in different playful activities**,** which were primarily influenced by the teachers' creativity**.** This suggests that most teachers recognise the value of using play as a vehicle for mathematical learning (Reikeras, 2020). Play-based learning is a central component of effective early ECE, particularly in the context of mathematics (Vogt *et al.,* 2018). MoET (2020) maintained that play allows children to explore mathematical concepts in a hands-on, experiential way, which helps to foster critical thinking, problem-solving, and a positive attitude towards mathematics from an early age. Maraisane (2022) further contended that engaging children in play-based activities supports cognitive, social, emotional, and physical growth, addressing the whole child.

The activities mentioned were designed to appeal to children's senses**,** which is a critical element in early childhood pedagogy. Sensory engagement is particularly important for young children as it helps them develop a deeper understanding of abstract concepts through concrete experiences (MacDonald *et al.,* 2021). For instance, activities might involve manipulating objects, counting with physical objects (like blocks or beads), or using tactile experiences to explore shapes, patterns, or sizes.

This finding ties into the broad theme of **play-based learning** and the importance of teacher **creativity in facilitating meaningful mathematical experiences**. Play is a foundational element of ECE, particularly in the context of the constructivist learning theories of Piaget and Vygotsky, which emphasise that children build their understanding through active engagement with their environment (Vygotsky, 1978). Teachers who effectively design playful mathematical activities are helping children to construct knowledge in a way that is enjoyable, interactive, and developmentally appropriate (Rusdawati, 2020).

This also connects with Omodan (2022) on the idea that social constructivist approaches promote collaborative interactions and varied contributions, allowing teachers and children to jointly design engaging play-based mathematics activities that improve comprehension through common objectives and personal interpretation (Evan, 2021). Most significantly, the mathematical knowledge gained through everyday play activities seems to be a natural component of cognitive development, often without adult instruction (Alharthi *et al.,* 2019). This also aligns with the integrated teaching and learning of SBAs because it advocates playful learning that incorporates a broad spectrum of cognitive, motor, social and artistic skills to support children’s ZPD (DEECD, 2012) and children’s holistic development (Maraisane, 2022).

- ***Effective planning and execution of mathematics activities***

The data highlights that, for most teachers, planned activities went as intended and successfully appealed to the children's senses. This indicates that the planning and implementation of mathematical activities were aligned, with teachers successfully creating environments that supported children's mathematical exploration (Sotuku *et*

al., 2016). Effective planning is critical in ECE, particularly when it comes to introducing abstract concepts like numbers, shapes, patterns, and measurement. The fact that the activities were sensory-rich suggests that teachers were mindful of providing a multisensory learning experience, which research shows supports better retention and understanding in young children (Evan, 2021). The ability to plan activities that are both engaging and mathematically relevant shows the teachers' competency and understanding of how young children learn best (Worthington & Van Oers, 2016).

This finding reflects the theme of **curriculum implementation** and teacher professionalism**.** The effective planning and execution of activities suggest that these teachers are skilled at translating theoretical curriculum goals into practical, engaging learning experiences. This is also related to the broader theme of **pedagogical content knowledge** (PCK) – the ability to combine subject matter expertise (in this case, mathematics) with effective teaching strategies that are developmentally appropriate for young children.

- ***Challenges in DT4's classroom: A different scenario***

A distinct scenario was observed in DT4's classroom, where the planned activities did not align with what was actually observed in practice. This discrepancy was attributed to DT4's lack of qualification and experience, as mentioned in the study. Lack of experience and underqualification are significant barriers to effective teaching, particularly in the context of ECE. Teachers with less experience may struggle with classroom management**,** activity adaptation, and ensuring that planned learning experiences are engaging and effective. In the case of DT4, this mismatch between planned and actual activities suggests that the teacher might have been unable to execute the planned activities effectively, or perhaps failed to adjust the activities in real-time to meet the needs of the children.

Furthermore, the inability to execute planned activities as intended may also indicate a lack of confidence or pedagogical expertise in designing or facilitating mathematical activities that are appropriate for young learners. This concern can be compounded in environments where teachers are underqualified or do not have access to adequate professional development opportunities. The discrepancy in

DT4’s classroom reflects the theme of **teacher quality** and professional development. Research shows that teacher qualifications, experience, and ongoing professional development are key determinants of teaching effectiveness. Teachers who are underqualified or lack experience may face challenges in delivering high-quality education, particularly in subjects like mathematics that require specific pedagogical strategies. This finding highlights the importance of teacher training and mentorship to support less experienced teachers in improving their practice and ensuring that all children have access to effective learning experiences.

- ***Teacher experience and impact on instruction***

The observation that DT4's activities deviated from the plan due to lack of experience and qualification draws attention to the critical role of teacher expertise in the successful implementation of educational activities. The ability to plan and deliver effective lessons requires not only an understanding of the curriculum but also a deep understanding of child development and effective teaching strategies. For teachers like DT4, inexperience might lead to difficulties in adapting to the dynamic nature of early childhood classrooms, where children's needs and responses to activities can change quickly. An experienced teacher is more likely to make real-time adjustments to the activity, find alternative materials, or modify the activity to suit the children’s interests and developmental stages. This is consistent with Baroody *et al.* (2019) who maintained that providing structured play experiences that guarantee educational experiences, learning trajectories, integrated instruction, and other pedagogical strategies might be useful and developmentally appropriate for early learning education. In contrast, a teacher with less experience may struggle to adapt or may feel less confident in adjusting their plans, leading to a less successful implementation.

This observation connects to the theme of **pedagogical adaptability** and the **need for professional growth**. Teachers in early childhood settings must be able to adapt their practices to meet the needs of individual children. Professional development opportunities that focus on responsive teaching**,** flexible lesson planning, and classroom management strategies are essential for teachers to build the confidence and skills required to navigate the complexities of the classroom environment.

- ***The role of teacher-child interaction in mathematics learning***

In the broader context of mathematical learning in ECCE settings, the role of teacher-child interaction is critical. This aligns with Ritchie (2021) who authenticated that teacher-child interactions secure high-quality education in ECE. The playful, sensory-rich activities mentioned in the study suggest that teachers were engaging children in active learning, which is essential for young children's mathematical development. However, when planned activities diverge from what is actually implemented, the quality of teacher-child interactions may also be affected. For example, if a teacher is struggling with executing the planned activity, they may not be able to engage children in meaningful conversations about mathematical concepts or facilitate learning in a responsive, interactive manner.

This finding relates to the theme of **teacher-child interaction** and its significance in early childhood education. Effective teaching, especially in mathematics, is not just about providing the right materials or activities but about how teachers interact with children during learning. High-quality interactions involve scaffolding**,** where teachers support children's thinking by asking probing questions, providing guidance, and encouraging problem-solving. This connects with Reikeras's (2020) view that scaffolding experimentation provides children with experience in developing mathematics skills. Teachers who are confident and well-prepared are better equipped to engage children in rich, mathematical conversations that enhance learning outcomes. Shah (2019) added that knowledge is generated through collaborative efforts so little ones build their understanding and reality through interactions with adults, which helps them to improve their cognitive skills and realise their greatest potential.

Lastly, the data highlights both the successes and challenges related to the implementation of playful mathematical activities in ECCE settings. While most teachers engaged children creatively and successfully with sensory-rich mathematical activities, the deviation observed in DT4's classroom underscores the importance of **teacher qualifications, experience, and ongoing professional development.** To ensure that all children receive high-quality early mathematical education, it is crucial to focus on supporting teachers through professional

development, mentorship, and training programmes that enhance their confidence and teaching effectiveness. Furthermore, the findings emphasise the importance of **play-based learning** in ECE, particularly in facilitating the development of foundational mathematical skills as stated by Griswold (2018).

5.2.4 Teaching practices/methods

For this study, teaching practices/methods are the strategies teachers use to make instruction and learning in ECCE environments easier that participated in this study. According to Ritchie (2021), classroom practices are central to gaining an in-depth understanding of teacher-student interactions to secure high-quality pedagogy. In this study, the classroom observations focused on instructional practices (see Section 5.2). The focus was primarily on the teaching practices to respond to the study's second research question: "*What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?"* The following subsections outlined the findings on the teaching practices of AT1 to HT8 participants.

5.2.4.1 Teacher 1 (AT1)

For a teaching practice to be implemented successfully, teaching aids, children's activities and classroom arrangement play a crucial part in the ECCE classroom. Therefore, I explored them in line with the teaching practices in the participating ECCE settings. In this setting specifically, an integrated teaching and learning approach was observed in which the teacher, as the adult, planned, guided and directed the mathematical lesson activities. She frequently used the chalkboard and navigated play with questions at the learning corners arranged thematically to explore children's interests and talents. As a result, it can be concluded that the integrated teaching and learning strategy (see Section 2.6.1) which was built on strengths and incorporated child-directed play, adult-led learning and guided play and learning, was evident in this setting. The inference is based on the teacher's and children's activities in this setting, where they used the classroom learning corner arrangement and manipulation of educational resources to facilitate play.

5.2.4.2 Teacher 2 (BT2)

The significant constituents of effective teaching practices are the TLMs, the classroom environment and children's activities. These constituents were seen in this setting and were considered during observation to discover the SBAs employed in this setting. I found that an integrated teaching and learning approach was partially practised in this classroom. The following mathematical activities highlighted integrated teaching and learning: teacher-planned activities, the teacher guiding and directing lesson activities, and children locating the number four in the classroom and placing a bottle top numbered four wherever they saw the number four. Although play at the learning corners was limited due to classroom space, an outdoor activity (see section 5.2.3.2) complemented mathematical play. Therefore, it can be concluded that adult-led learning through teacher-planned activities and guided play and learning (outdoor activity) were evident in BT2's classroom.

5.2.4.3 Teacher 3 (CT3)

For a teaching practice to be effective, consideration of TLMs, classroom arrangement and student-teacher interaction through activities is essential. I followed this claim during CT3's classroom observation. The existing SBAs in this setting were looked into alongside the TLMs, the arrangement of the learning corners and the teacher-children's mathematical activities. I found that play activities were observed in this setting due to the arrangement of learning corners and the teacher's guidance in using them to facilitate children's interests. Based on the above inference, an integrated teaching and learning approach was used because of the activities planned by the teacher, learning corners organised according to lesson objectives, and guided play at the learning corners – these activities ensured that the children's interests and strengths were uncovered.

5.2.4.4 Teacher 4 (DT4)

Like AT1, BT2 and CT3, classroom teaching practices observed in DT4's setting also considered the TLMs available and used during teaching and learning, the arrangement of learning corners to facilitate guided play, and the mathematical activities that mediated teaching instruction in this ECCE setting. The results

highlighted that the three aspects mentioned above were not seen in this setting. Instead, teacher-centred learning, demonstration and discussion were the teaching practices that shaped the teaching and learning process in this setting. The following activities showed the above practices: the teacher selects children to introduce the number three to them; the teacher shows the children how to clap their hands three times and asks them to clap their hands; the teacher asks the children to show three fingers and collect three stones outside. Therefore, it can be concluded that the demonstrations and questions by the teacher showed teacher-centred learning, with the teacher doing most of the activities while play was not seen at all. Most crucially, children's talents, strengths and interests were not explored, which could have highlighted any SBAs.

5.2.4.5 Teacher 5 (ET5)

Lesson observation in this ECCE setting followed the same routine as the other settings in this study. This implies that TLMs, learning corners and teacher-children's activities were informative in exploring SBAs in this setting. The evidence I gathered through the observation sheet confirmed that TLMs were available and used and learning corners were arranged according to the day's topic and employed. The teacher's and children's mathematical activities were playful and engaging. As a result, in line with the above findings, I concluded that an integrated teaching and learning approach was practised in this setting because the teacher planned, arranged and guided the classroom activities to achieve the lesson's objectives. In addition, playful activities were displayed at the learning corners where groups of children gathered; one activity involved children taking turns counting three items and finding the number three at various learning corners.

5.2.4.6 Teacher 6 (FT6)

The teaching practices observed in this setting highlighted the effective use of improvised TLMs similar to CT3. The arrangement of the learning corners in the classroom was evident, though it was observed that limited space restricted play in those areas. BT2 also experienced the same challenge of limited space as FT6. However, the children's engagement through planned various playful activities was seen during the lesson presentation phase. Different mathematical activities were

introduced to children by the teacher and children performed such activities (see Section 5.2.3.6). As a result, the varied playful mathematical activities helped me determine that teacher-guided play and learning were occurring – this showed that integrated teaching and learning strategies partially existed in this particular setting.

5.2.4.7 Teacher 7 (GT7)

Like all other settings, GT7 was no exception and TLMs, classroom arrangement and children's mathematical activities played crucial roles in portraying teaching practices informing mathematical play pedagogy in this setting. Discussions and demonstration teaching methods were used during the lesson presentation phase in class A. For instance, the teacher introduced the number four with number cards, wrote it on the board, drew it in the air, asked the children to say it in Sesotho and English, and traced the number on the flashcards.

In addition, play-based learning was used when children shifted to learning corners in class B. The teacher-guided play activities in the learning corners during this lesson were according to the day's theme. The activities included children pointing to the number four around the class, grouping four items in the learning corners, and locating the number four in the books in the library corner.

Consequently, it seemed reasonable to assume that an integrated approach to teaching and learning was used in this setting because the teacher, as the adult, planned the lesson, arranged the learning corners and guided the instruction and learning process – highlighting the adult-led learning aspect of the integrated learning approach. Also, he integrated teaching and learning approach involved children playing at the learning corners led by the teacher guiding them with questions.

5.2.4.8 Teacher 8 (HT8)

The consideration of the TLMs, classroom arrangement and children's activities was also extended to HT8. Child-centred learning, guided discussion and demonstration teaching practices were experienced during the observation in this setting. This conclusion was motivated by the many activities that children did during discussions through teacher guidance and demonstration. The activities included counting five

fingers, bottles, and dots. Children also joined the dots and coloured them to make a horse. Children did more inside activities which did not incorporate play because the learning corners were unused. In addition, an outdoor activity was prepared where children playfully formed groups based on the number the teacher called. Hence, it was noted that guided play was partially incorporated during teaching and learning in this setting which symbolises limited integrated teaching and learning.

5.2.4.9 Summary of the data on teaching practices

The observed findings from the participants' teaching practices show that integrated teaching and learning, teacher-centred learning, child-centred learning, guided discussion, and demonstration teaching practices were used in the eight ECCE settings. The outcomes highlight that the integrated approach was fully implemented by AT1, CT3, ET5 and GT7, whereas it was partially seen with BT2, FT6 and HT8. The results further indicated that DT4 practised teacher-centred learning while HT8 practised child-centred learning. Guided discussion and demonstration teaching practices were also seen with GT7 and HT8. Thus, one might conclude that only one SBA (integrated teaching and learning) was evident in most ECCE settings (AT1, BT2, CT3, ET5, FT6, GT7 and HT8). Nevertheless, teacher-centred and child-centred learning were implemented by DT4 and HT8, respectively, with GT7 and HT8 using guided discussion and demonstration teaching practices. Below, I outline the practices and their implications.

- ***Integrated teaching and learning***

The integrated approach was identified as the most commonly implemented strategy, particularly in AT1, CT3, ET5, and GT7, where it was fully adopted. An integrated teaching and learning approach generally involves the blending of multiple subject areas into a cohesive learning experience which is considered an effective strategy in early childhood education (Phosisi, 2019). This type of approach helps children see connections between different areas of knowledge and fosters holistic development (Maraisane, 2022). As acknowledged by Trundle and Smith (2017), in the ECCE context, integrated learning allows children to explore various aspects of development – cognitive, emotional, social, and physical – through interconnected

learning experiences. For example, a lesson on counting could incorporate elements of storytelling, art, or outdoor exploration, integrating language, mathematics, and physical development. Research consistently supports the effectiveness of integrated learning for young children as it fosters critical thinking, creativity**,** and the ability to make connections between different concepts (Askew & Venkat, 2020). The integrated approach also aligns with the principles of constructivist learning by Vygotsky (1978), where learning is seen as a process of building on prior knowledge and experiences, and children are encouraged to make meaning through active exploration.

However, observations showed that teachers in these ECCE settings often controlled the learning environment through lesson planning, organising learning corners, and guiding instruction. This was evident in the integrated teaching and learning approaches observed, where the teacher was responsible for planning, organising, and directing the activities, leading to a more teacher-directed rather than child-initiated learning experience. The dominance of adult-led learning implies that a highly adult-led learning environment may restrict children's opportunities to engage in learning experiences that are appropriately challenging yet within their ZPD which goes against Vygotsky's (1978) theory.

A more balanced approach, where teachers guide and scaffold children's independent exploration, would likely be more effective in supporting children's development in ways that align with the ZPD and mathematical play pedagogy. This balance would allow for more child-initiated learning while still benefiting from the expertise and guidance of the teacher, fostering deeper engagement and understanding. This aligns with Evan (2021), who claimed that play is orientated around mathematics concepts and is led by the child; the teacher may enrich it by tailoring activities and assisting with materials, ideas and questions to leverage when discussing new concepts.

Despite that, the widespread use of integrated teaching and learning highlights the importance of interdisciplinary learning in early childhood education. This approach also reflects a movement away from siloed subject teaching towards holistic learning**,** which aligns with the broader educational philosophy of preparing well-

rounded, critical thinkers capable of applying knowledge across various domains. It also connects to curriculum innovation**,** where the focus is on providing rich, meaningful learning experiences that mirror real-world complexities.

- ***Partial implementation of integrated teaching***

While the integrated approach was fully implemented in some settings (AT1, CT3, ET5, GT7), it was partially implemented in others (BT2, FT6, and HT8). The partial implementation suggests that these teachers may have faced challenges in fully adopting integrated learning or experimenting with different approaches to see what worked best in their specific contexts. The partial implementation of integrated learning may be attributed to factors such as time constraints**,** lack of resources**,** or teacher familiarity with the approach**.** For example, integrating different subject areas requires careful planning and sufficient time for children to engage with the material, which can be difficult in classrooms with large numbers of children or insufficient resources. Therefore, teachers who partially implement integrated learning may benefit from ongoing professional development to enhance their understanding and skills in delivering integrated lessons. Such training could focus on curriculum design**,** classroom management strategies for integrated lessons, and ways to assess learning across multiple domains simultaneously.

This observation speaks to the broader theme of **teacher preparedness** and **professional development.** While many teachers recognise the value of integrated learning, their ability to fully implement it may depend on their level of training, experience, and the support they receive in the form of resources, time, and professional development. It also reflects the theme of **educational equity**, as some teachers may be better positioned to implement integrated practices depending on the resources available to them.

- ***Teacher-centred learning***

Teacher-centred learning was specifically practised in DT4's classroom**,** where the teacher took a more traditional, directive approach to teaching. In teacher-centred classrooms, the teacher typically plays a dominant role in delivering information, while students are more passive recipients of knowledge (Pyle & Danniels, 2017).

This contrasts with student-centred approaches where the teacher facilitates learning rather than dictates it. Research has shown that teacher-centred practices can limit opportunities for children to develop critical thinking and problem-solving skills, as students are less likely to engage in independent or collaborative thinking. For young children, this approach may not be as effective in fostering curiosity or intrinsic motivation. The teacher-centred approach in DT4 may be linked to the teacher's lack of qualifications and experience, as noted in previous discussions. Teachers who are less experienced may default to more familiar, traditional methods of teaching, especially if they lack confidence in more interactive or child-directed approaches. In addition, the lack of professional development opportunities might prevent teachers from exploring or adopting more contemporary, child-centred pedagogies.

This aspect ties into the theme of **teacher quality** and professional development**.** Teacher-centred learning may be more prevalent in settings where teachers feel less equipped to implement more progressive or child-centred strategies. Professional development in active, hands-on learning and interactive pedagogies could help teachers like DT4 move away from overly rigid, teacher-directed methods towards more engaging and effective practices. It also ties into the theme of **pedagogical evolution,** where teaching practices evolve based on experience, training, and educational philosophy.

- ***Child-centred learning***

In contrast to teacher-centred learning, child-centred learning was practised by HT8**.** This approach emphasises the active role of the child in their own learning, with the teacher facilitating and guiding rather than directing the learning process. Children are encouraged to explore, question, and learn through hands-on experiences and problem-solving tasks. Child-centred approaches have been shown to support critical thinking**,** independence**,** and self-regulation**,** which are important developmental outcomes for young children (Ramani *et al.,* 2019). In this model, children are seen as active participants in their own learning, and the teacher acts as a guide or facilitator who scaffolds their learning through questions, feedback, and encouragement. The child-centred approach aligns with constructivist theories of learning, where knowledge is actively constructed by the child through social

interaction and engagement with the environment. This approach is also linked to the ZPD (Vygotsky, 1978), where the teacher provides just enough support to help children achieve tasks they cannot do independently.

The focus on child-centred learning is central to the theme of **progressive education** and the **child as an active learner.** It also ties into the theme of learner autonomy and the development of life skills such as problem-solving and self-regulation. The child-centred approach underscores the importance of creating learning environments where children are encouraged to take ownership of their learning.

- ***Guided discussion and demonstration teaching practices***

Guided discussion and demonstration teaching practices were observed in GT7 and HT8, with teachers guiding children through structured conversation or demonstrating tasks to facilitate learning. This teaching strategy encourages dialogue and reflection, where children's ideas are elicited, discussed, and challenged. It allows for deep exploration of concepts and promotes critical thinking and verbal expression. Guided discussions are highly effective in developing language skills and they provide opportunities for children to make connections between different ideas and concepts. Demonstration, on the other hand, is a more hands-on approach where the teacher shows children how to perform a task or solve a problem. This can be particularly beneficial in teaching concepts that require a visual or procedural understanding (e.g. how to count and how to arrange objects by size or shape).

Similarly, according to Reikeras (2020), through demonstration, teachers model mathematical concepts, providing a reference for children to explore and build upon in their play. Vygotsky (1978) emphasised the sentiment that teachers play a crucial role in providing their children with the activities within their ZPDs and scaffolding them to reach their maximum potential. This was also evident in Figure 5.25 when an outdoor activity was prepared in which children were asked to form groups according to the numbers called by the teacher from one to five. Children, through the supervision of the teacher, formed groups for this socially interactive activity to

achieve mathematical outcomes. This implies that a more knowledgeable teacher provided the right level of support to help children move from what they could do alone to what they could do with assistance in this activity. The above practices align with the theme of **interactive and participatory learning** advocated by Vygotsky (1978)**.** Guided discussions and demonstrations offer opportunities for active engagement and help develop critical thinking skills in young children. These methods also reflect a move towards more student-centred teaching practices, as they provide space for children's ideas and foster more collaborative learning environments.

The above teaching practices have broader implications and connections to the following educational themes: diversity of teaching approaches, teacher preparation and professional development, and child-centred learning and progressive education. The variety of teaching strategies (integrated, teacher-centred, child-centred, guided discussion, and demonstration) reflects the diverse pedagogical beliefs and practices within ECCE settings. These variations underscore the need for differentiated teaching that caters to the individual needs and learning styles of children. They also highlight the broader theme of **pedagogical flexibility**, where teachers need to adapt their approaches based on context, classroom dynamics, and children's developmental stages.

Similarly, the variation in teaching practices also indicates the importance of teacher training and professional development in ensuring that teachers are equipped to implement a range of effective teaching methods. Teachers who are trained in multiple pedagogical approaches, such as integrated learning, guided discussions, and child-centred methods, are more likely to provide a rich, varied learning experience for their students. The findings suggest that teacher professional development programmes should focus on enhancing teachers' ability to implement a range of student-centred, interactive, and integrated teaching practices**.** Lastly, the adoption of child-centred practices is in line with the broader educational movement towards active learning and engagement supported by Kalpana's (2014) claim that the mediation principle of social constructivism permits youngsters to participate actively in their education rather than only being passive information consumers. In

the next section, I present the implication of these observation findings for the Lesotho context.

5.2.5 Implication of the observation findings to Lesotho early childhood context

The results of the observations show that mathematical play pedagogy in Lesotho has a variety of qualities, indicating both strengths and areas for potential improvement. Classroom arrangements are well-planned and seem to create an atmosphere that promotes discovery and engagement while promoting enjoyable learning advocated by the Lesotho syllabus (Maraisane, 2022). This arrangement increases young children's interest in mathematics and is essential for keeping them engaged. For example, in section 5.2.3.3 play-based activities done by children in the CT3 setting included finger tracing the number two on the flashcards, matching two of the same items in different learning corners and identifying the number two on the number charts (see Figure 5.20). The above activities increased children's engagement and interest in mathematics learning. These findings agree with the MoET (2021) that the environment and play are essential elements that support each other in the integrated play-based learning approach advocated by the Lesotho ECCD curriculum.

More so, the presence of homemade and culturally relevant materials indicates a commitment to using resources that resonate with children's backgrounds (Swart *et al.,* 2016). For instance, in the CT3 classroom, each corner is fitted with age-appropriate chairs made of trees, the fantasy corner has a shop where bread flour looks like the product and the art corner has improvised watering cans made of containers (see Figure 5.12). This not only makes learning more relevant but also empowers teachers and children to create and innovate, supporting a richer learning experience (Lee, 2015). This is also in line with Frimpong (2021), who advocates quality in ECE by ensuring that children have access to and engagement with TLMs before and during sessions so that teaching and learning objectives can be met effectively.

In addition, child-centred and integrated teaching and learning approaches signify a shift towards recognising the individual needs and interests of children and suggest that lessons are designed to connect mathematics with other subjects, reinforcing the idea that math is applicable in various contexts (ECMG, 2022). Also, incorporating guided discussions and demonstrations indicates a strong commitment to collaborative learning advocated by the MoET (2020). As a result, these pedagogical stances, according to Reikeras (2020), seem to promote active participation, social interaction, critical thinking, and a deeper understanding of mathematical concepts. Lastly, while teacher-centred approaches provide foundational knowledge, it is crucial to balance this with more interactive methods. Effective pedagogy in math should blend direct instruction with opportunities for exploration and play (MoET, 2020).

Overall, the findings of these observations show that mathematics education explored through SBAs in Lesotho is moving in the right direction towards becoming more dynamic, culturally sensitive, and child centred. However, ongoing reflection and adaptation are necessary to ensure that all pedagogical practices are aligned to foster deep mathematical understanding through play and exploration, as advocated by the Lesotho ECCD curriculum (MoET, 2021).

5.3 Phase 2: Semi-structured Interviews

Data from semi-structured interviews was collected using an interview guide that I developed (see Appendix I). Maree (2020) explained that a semi-structured interview guide defines the study area; therefore, investigators must be vigilant when assessing participants' feedback to observe new, developing fields of study closely connected to the investigated phenomenon. The interview guide was tailored to respond to the four study research questions outlined in Section 1.5.4. The research questions are summarised in Table 4.2 and the items of the interview guide are detailed in Section 4.8.2). Similarly, TCA discussed in Section 4.10 was employed to analyse the information obtained through the semi-structured interviews. I followed the same order of codes I used during the data analysis of the classroom observations.

As discussed in Section 5.2, I gained insights into the teachers' teaching backgrounds, profiles and settings from the observations made in the ECCE classrooms. The semi-structured interviews came next and supported the evidence gathered from the classroom interpretations. In other words, the semi-structured interviews helped validate the data collected in the classrooms from the eight individuals. Because these were in-person interviews, the participants' interpretations of the questions could be made clear (Creswell, 2020; Cohen *et al.,* 2018). The duration of the interviews was around one hour, and their format varied based on the participants' explanations, as previously indicated in Section 4.8.2.

Thus, this data analysis phase is organised according to each theme that emerged from the data taken from AT1 to HT8. The literature on the SBAs and theoretical framework assisted in shaping this phase, and I synthesised and organised the data using various categories. This made it easier to interpret the data and identify the information that addressed each interview question. After the data is presented, there is a thorough discussion of the data summary covering each of the data themes. In line with the questions and the data, the subsequent themes emerged: philosophical perspectives on learning, responsive teaching and learning practices, diverse learning materials and professional development and support. In this study, literature and theory were also used with the data to provide the findings and outcomes of this study. Next, I discuss the development of themes for this data analysis phase.

5.3.1 Development of themes for this phase

As indicated in the previous section, the interviews were structured to respond to the study's four research questions. Four themes were developed from the 14 questions in the interview guide. In preparation for the interviews, the data from lesson observations assisted me in understanding each participant’s perspectives about the research topic and how they do things in their classrooms. I employed the interviews as a second data-gathering method to understand, verify and corroborate the participants’ perspectives and teaching practices observed in the participating ECCE settings.

In this study, the participants' comprehension of a strength-based strategy was important. As a result, the questions clearly demonstrated the teachers' grasp of a strength-based strategy, the SBAs they use in their ECCE settings, and the TLMs they use to facilitate mathematical play pedagogy. I also developed interviews using this study's research goal, literature and theory to prompt the necessary questions in line with the research's main goal. Consequently, the highlighted themes in Table 5.3 have been linked with the research questions of the study, literature and theory guiding this study. In analysing the themes in this phase, the literature and theory shown in this table were explored to support or test the findings. For instance, in scrutinising philosophical perspectives on learning, the literature and theory stated alongside were employed to back up and challenge the results.

Table 5.3: Relationship between interview themes, research questions, literature and theory

Research Question 1: What are the teachers' understandings of SBAs that support mathematical play pedagogy in ECCE settings?		
Themes	**Theory**	
Philosophical Perspectives on Learning	**Literature**	**Theoretical framework**
	Fenton *et al.* (2016); Galloway *et al.* (2020); MacDonald *et al.* (2021); SPFPH (2019) and Swart *et al.* (2016).	Teachers' understanding of strengths-based mediation in mathematics lessons in ECCE settings denotes their understanding, interaction and engagement from lesson development to the facilitation process highlighting children's ZPD.
Research Question 2: What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?		
Responsive Teaching and Learning Practices	Galloway *et al.* (2020); DEECD (2012), Swart *et al.* (2016); Caiels *et al.* (2023).	Participants' application of SBAs in their classrooms teaching mathematics through play symbolises mediation and interaction principles of social

		constructivism.
Research Question 3: How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?		
Diverse Learning Materials	Askew and Venkat (2020); Gripton and Williams (2023); Maraisane (2022); Reikares (2020); Rusdawati (2020); Vogt *et al.* (2018).	Playful learning using TLMs encompasses children's involvement, thinking, and integration of a broad spectrum of creative, intellectual, athletic, and social skills to support children' ZPD.
Research Question 4: How can SBAs be strengthened to support mathematical play pedagogy in ECCE settings?		
Professional Development and Support in early education	SPFPH (2019); Swart & Bartlett (2016); DEECD (2012); Swart *et al* (2016); and VDEECD (2022).	The ZPD describes the area or environment where children learn and develop and where teaching and learning (pedagogy) takes place using a language that is clear, specific and concise.

5.3.2 Interpretation and discussion of interview themes in Table 5.3

When interpreting and discussing the interview themes, I used the same codes (AT1, BT2, CT3, DT4, ET5, FT6, GT7 and HT8) as phase one's data analysis. This procedure assisted me in determining the tendencies, commonalities, relationships and significant variations in the participants' perspectives. Nhase (2019) acknowledged that semi-structured conversations are used together and coded based on how similar and dissimilar the opinions and responses are. This implies that data from each theme was categorised, grouped and coded in line with the similarities and differences of the responses and views of eight participants in this

study. In the following subsections, I display, interpret and discuss the themes in the order of appearance in Table 5.3.

5.3.2.1 Philosophical perspectives on learning

In this research, philosophical perspectives on learning refer to the foundational theories and beliefs guiding teachers' understanding of how learning occurs and what it means to children. The understanding of participants' strength-based strategies was significant in this study. The interview data included participant perspectives on how they perceive and understand this approach. This theme assisted me in responding to the study's first question *"What are the teachers' understandings of SBAs supporting mathematical play pedagogy in ECCE settings?*" because it elicited teachers' beliefs about the value of play in learning and its role in fostering a love for mathematics using SBAs and discussions on how these beliefs shape classroom practices and curriculum design.

Regarding teachers' understanding of SBAs, several teachers revealed limited knowledge of this approach to the extent of seeking explanations from a researcher. This was evident when DT4 said, *"I do not know the strength-based approaches at all. What are they?"* On the same issue of eliciting teachers' perceptions on the effectiveness of SBAs facilitating mathematical playful learning, more teachers were unsure of the SBA's effectiveness in facilitating mathematical playful learning. For instance, here is BT2's response: "*Unless you explain what strength-based approaches are, I will not be able to respond to this one."*

Based on the above findings, it can be concluded that there is little teachers' understanding of SBAs in the ECCE settings participating in this study. This theme highlights the broader challenge of a **gap in effective pedagogical practices,** which resonates with Breathnach *et al*. (2017) and Bubikova-Moan *et al.* (2019), who affirm that teachers' attitudes, beliefs and experiences play a substantial role in adopting play as a pedagogical tool in engaging children in mathematical play. This also poses a challenge to Vygotsky's description of mediational methods which refers to unique approaches used under certain circumstances (Vygotsky, 1978).

Most significantly, I also believe that teachers' little knowledge might go against integrated teaching and learning approaches, which advocate environments that provide children with socially mediated learning opportunities created by knowledgeable adults (VDEECD, 2016). Teachers' little knowledge might also defy MacDonald *et al.'s* (2021) view that teachers in ECCE learning environments respond to using play to uncover children's strengths and abilities and include them in mathematical tasks. Lastly, limited understanding may also prevent teachers from orienting play around mathematical concepts and enriching it by tailoring activities and assisting with materials, ideas and questions to leverage when discussing new concepts (Evan, 2021).

The study's findings suggest that teachers in the ECCE settings under investigation have a limited understanding of SBAs and their role in fostering mathematical play. This lack of knowledge presents a significant barrier to the effective implementation of play-based pedagogy that can support children's mathematical development. It highlights a broader concern in teacher education and professional development within ECCE settings, particularly in ensuring that teachers are equipped with the theoretical knowledge and practical skills necessary to adopt contemporary, child-centred pedagogies.

The implications are clear: for SBAs and play-based learning to be effectively integrated into ECCE settings a focused effort is needed to enhance teachers' understanding of these approaches. This could involve targeted training on the principles of strength-based teaching as well as strategies for incorporating mathematical play into the curriculum. Further research should explore how teachers' beliefs about learning influence their pedagogical practices and how they can be supported in bridging the gap between theory and practice in early childhood mathematics education.

Ultimately, the findings underscore the need for professional development that not only addresses pedagogical techniques but also enhances teachers' theoretical understanding of how play and mathematical concepts can be integrated to create rich, engaging learning experiences for young children. This study suggests that professional development, better curriculum alignment, and support for teachers'

theoretical and practical understanding of play-based learning can help bridge the knowledge gap and improve pedagogical outcomes. By addressing these concerns, ECCE teachers can create more effective, inclusive, and engaging learning environments for young children, particularly in mathematical play.

5.3.2.2 Responsive teaching and learning practices

This theme involves adapting teaching strategies to meet the diverse needs, interests and abilities of each child in a way that is timely, relevant and effective. Finding out about the existing SBAs was critical in this research. The following query was put to participants regarding this issue to verify the existence of SBAs in the participating ECCE settings after classroom observations. This theme was meant to address the second research question of this study (see Section 1.5.4). Here is the specific question asked: "*In your reception class, what strength-based teaching and learning approaches do you use to engage children in playful mathematics learning?"* With this question, I intended to corroborate data from the classroom observations.

On the responses gathered about the existing SBAs, I can conclude that the following SBAs were used in the eight participating ECCE settings: integrated teaching and learning approach, inclusion of parents, assessment for learning and development, and cultural sensitivity. Only GT7 was an exception, as she indicated that she does not ever use them. Evidence showed that AT1, BT2, CT3, ET5, FT6 and HT8 spoke about integration of teaching and learning. More so, parents were included in the responses of DT4 and ET5. In addition, the answers of BT2, ET5 and HT8 confirmed the use of assessment in the interests of learning and growth. The responses of DT4 and ET5 also highlighted the cultural sensitivity aspect. For instance, ET5 said, *"I use integrated teaching and learning, assessments for learning and development, parental engagement and culturally made teaching and learning materials."* In a nutshell, many SBAs employed included integrated teaching and learning, then assessment for learning and development, followed by the inclusion of parents and cultural sensitivity in these ECCE settings.

The existence of the SBAs in the participating settings connects with responsive teaching and learning practices. In this theme, techniques used by teachers to adapt instruction are based on children's interests, strengths, and learning styles. This is in line with AGDE's (2022) opinion that teachers must recognise children's strengths and interests to engage children in learning actively. This theme also illuminates that there is also a balance between structured guidance and open-ended exploration. The above claim is parallel to Göncü and Main's (2023) connotation that the ZPD and scaffolding of social constructivism support both teacher-initiated and child-initiated learning experiences, suggesting that early childhood teachers should take the initiative to set up a demanding learning environment for young children and have the pedagogical know-how and abilities to instruct while the children are playing, thus redefining teaching in ECE.

5.3.2.3 Diverse learning materials

Diverse learning materials mean a wide range of resources that support and enhance learning in consideration of the various needs, strengths, preferences and abilities of children. The impact of TLMs in facilitating mathematical play pedagogy in the ECCE settings is already shown in Section 5.2.2. Maraisane (2022) clarified that TLMs influence what children learn, how well they learn, and the standard of teachers' instructional and assessment strategies. This theme assisted in responding to the study's third question, *"How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?*" In line with the above question, I found it vital to elicit verbal participants' responses by investigating three specific questions (see items 8, 9 &10, Appendix I) regarding TLMs.

The first of the three questions elicited information on the adequacy of the TLMs facilitating mathematical play pedagogy. The feedback from many teachers revealed that there were enough TLMs in six (AT1, BT2, CT3, DT4, ET5, and GT7) ECCE settings that participated in this study. Below is an example; CT3: "*Yes, they are enough. Each and every quarter, we attend material production workshops."* FT6 and HT8 confirmed there were insufficient TLMs in their settings because the government does not provide any.

The second question of the three gathered responses on the use of either ready-made or homemade TLMs or both to facilitate mathematical play pedagogy. It was found that almost all the respondents who participated in this study admitted to using both homemade and ready-made TLMs. The findings from BT2 and ET5 further revealed that parents and teachers made TLMs. BT2 said, "*I use both. Hakere, some are given to us by World Vision, some are made by parents and also by me."* Similarly, the provision of TLMs by the government and World Vision was also depicted in BT2, ET5 and FT6's responses. Therefore, it can be said that ready-made and homemade TLMs were used in the eight ECCE settings sampled in this study – the government and NGOs provided ready-made TLMs while teachers and parents produced homemade ones.

The last question regarding the engagement of parents during the development of playful TLMs was also investigated. All eight participants agreed with the question. Even HT8 initially agreed before saying that few parents participated. She said, "*Yes, I engage parents to develop teaching and learning materials even though very few participate because parents say they are busy".*

Based on the above responses to the three questions regarding TLMs facilitating mathematical play pedagogy, I concluded that sufficient ready-made and homemade TLMs provisioned by the government and NGOs were evident in several ECCE settings in this study. Also, the findings confirmed that parents and teachers developed homemade TLMs for facilitating mathematical play pedagogy in these ECCE settings.

The availability of TLMs, the use of both ready-made and homemade TLMs as well as the engagement of parents in the development of TLMs correlate with diverse learning materials. An adequate supply of TLMs emphasises the importance of material production workshops, and this supports Maraisane's (2022) assertion that TLMs significantly influence learning outcomes and instructional quality. The use of both ready-made and homemade TLMs highlights the collaborative efforts of parents and NGOs in material production.

This also reflects the need for varied resources in pedagogy, as discussed in educational frameworks advocating hands-on, engaging learning experiences in young children's early mathematical instruction (MacDonald *et al.,* 2021). Parental engagement in TLM development was seen although some noted limited participation due to parents' busy schedules. This theme echoes findings in the literature about the importance of family engagement in early education, which enhances learning and community involvement (Swart *et al.,* 2016) recommended by SBAs.

In line with the above information, the following conclusions can be drawn: diverse TLMs are key to effective mathematical play pedagogy, teacher and community involvement enhance educational quality, barriers to parental engagement require attention, government support for TLMs is inadequate and educational frameworks should emphasize hands-on learning. Moving forward**,** policymakers should consider increasing funding for TLMs and promoting initiatives that involve communities in the creation and distribution of these materials. Teachers should receive ongoing professional development to support the creation and use of both ready-made and homemade TLMs as well as training on engaging parents and the wider community in educational practices. Schools should develop strategies to overcome barriers to parental involvement, ensuring that all parents have opportunities to contribute to their children's educational development in meaningful ways. Lastly, schools and NGOs should continue to develop collaborative models for TLM production and distribution, ensuring that resources meet the specific needs of the children in different ECCE settings.

5.3.2.4 Professional development and support in early education

Professional development and support in early education in this case refers to processes, programmes and resources used to enhance the knowledge, skills, and practices of teachers working in ECCE settings as well as the support structures in place to assist them to succeed in their roles. Pinpointing how SBAs can be strengthened in ECCE settings was very important in this study; hence, the specific research question in Section 1.5.4 and this theme in Table 5.3. To achieve this objective, the interview guide had four questions (see items 11–14 Appendix I) to

gather data from participants concerning this theme. Item 11 drew teachers' responses to whether they are properly trained to teach mathematics through play using SBAs. Item 12 investigated whether it is necessary to encourage reception class teachers to strengthen play pedagogy using SBAs to teach mathematics. Item 13 demanded reasons to support responses for item 12. Item 14 sought other suggestions teachers may have for strengthening/improving play pedagogy to enhance mathematics learning using SBAs in the reception classes. Below are the responses from each item.

The findings for item 11 illustrated that several participants (BT2, CT3, DT4, ET5, FT6, GT7 and HT8) were not adequately trained to teach mathematics through play using SBAs in these ECCE settings. For instance, FT6 said, *"No 'm'e ('M'e is a Sesotho word translated into mother). I am not trained in that."* It was also observed that only one participant (AT1) was trained in two (integrated teaching and learning, and the inclusion of parents) out of five SBAs. Therefore, it is reasonable to infer that proper training in SBAs was insufficient and needed to be enhanced to strengthen SBAs in the participating ECCE settings.

Furthermore, considering the responses to item 12 regarding whether it is necessary to encourage reception class teachers to strengthen play pedagogy using SBAs to teach mathematics, it was discovered that almost all participants were positive about this matter. The evidence was further supported by the provision of substantiating statements by some participants (CT3, ET5 and GT7). For instance, CT3 opined:

> *I think it is important for reception class teachers to strengthen play pedagogy using strength-based approaches because they encourage the use of available resources in our environments, the use of those resources to develop natural playgrounds to promote our culture and also that strength-based recommends holistic assessment for development, not intellectual development only.*

As a result, it can be concluded that SBAs must be encouraged to strengthen mathematical play pedagogy in ECCE settings.

Apart from that, the overall responses for item 13 to why it is necessary to encourage reception class teachers to strengthen play pedagogy using SBAs are outlined. The evidence revealed various reasons, including children's strengths, culture, interaction, assessment, improvised resources, integration, parental engagement, solutions to problems, and variance of teaching and learning with new approaches. Many participants (BT2, CT3, GT7 and HT8) justified that assessment is essential in early learning environments. In addition, AT1, BT2 and CT3 stipulated the importance of culture. It is also worth noting that CT3 and FT6 acknowledged using improvised resources. Similarly, an integrated perspective was specified by DT4 and HT8. Finally, parental engagement, interaction, solutions to problems and variations of teaching and learning approaches were mentioned by BT2, DT4, ET5 and FT6, respectively. Therefore, I can argue that SBAs must be encouraged in ECCE settings for the above reasons raised by the participants.

On the matter of having any suggestions for ways to strengthen play pedagogy to enhance mathematics learning using SBAs, many participants, DT4, ET5, FT6, GT7 and HT8, shared the same sentiment of not having other suggestions because they were not knowledgeable enough about these approaches. For instance, GT7 exclaimed, "*No other suggestions because I do not know more about these approaches".* However, AT1, BT2 and CT3 proposed the following ways: more parental engagement, sponsored quarterly reflection meetings and training specific to SBAs.

In line with the above responses to the four questions regarding ways of strengthening play pedagogy to enhance mathematics learning using SBAs, I concluded that proper training in SBAs was insufficient and needed to be improved; more parental engagement was essential; SBAs must be encouraged in the ECCE settings; and sponsored quarterly reflection meetings need to be held for teachers to strengthen play pedagogy to enhance mathematics learning using SBAs.

The above findings underscore the necessity for enhanced training in SBAs, the promotion of play pedagogy, and the implementation of supportive structures like parental engagement and reflective practices. Addressing these areas might significantly strengthen the professional development framework for ECCE teachers,

ultimately leading to improved educational outcomes for children. In the following section, I outline what the interview findings mean about the quality of play-based mathematical pedagogy in Lesotho.

5.3.3 Implication of the interview findings to Lesotho's early childhood context

The findings from interviews on SBAs in Lesotho's early childhood context have several significant implications, including the need for enhanced training, collaboration with parents and communities, ongoing support structures, valuing play and integrating cultural contexts, responsive teaching practices, resource availability and production, and holistic assessment approaches.

The limited understanding of SBAs among teachers highlights a critical need for comprehensive professional development programmes. Training initiatives should focus on familiarising teachers with SBAs, emphasising their importance in facilitating playful learning and mathematics instruction. This is essential for aligning teaching practices with modern pedagogical frameworks and ensuring teachers feel confident implementing these strategies (MacDonald *et al,* 2021).

Similarly, professional development initiatives encourage strategies for involving parents actively in their children's education, which enhances resource availability and supports community involvement in ECCE settings. This is so because the importance of parental engagement in developing teaching and learning materials was observed which points to the need for stronger partnerships between teachers and families in Lesotho. This resonates with parent empowerment theories, which see parents as partners and experts on their children (Swart *et al.,* 2016).

Also, the suggestion for quarterly reflection meetings highlights the need for continuous support and professional learning communities. This is so because reflective practices permit teachers to gain insight into the child's personality, strengths, desires and priorities by getting to the core of the matter (UKDHSC, 2019)**.** Establishing regular opportunities for teachers to share experiences, reflect on practices, and learn collaboratively can foster a culture of ongoing improvement and innovation in teaching methodologies. A similar opinion is held by MacDonald *et*

al. (2021) who claim that the SBA is a practice framework that includes preparation, activity, review, learning and reflection.

The recognition of play as a fundamental aspect of learning is crucial (MoET, 2021). Teachers in Lesotho need support in developing play-based curricula that integrate mathematical concepts. This is consistent with the ECMG (2022), who maintain that fostering a cultural shift within ECCE settings to value play not just as a recreational activity but as a vital learning tool enhances engagement and understanding of mathematics.

Furthermore, the reliance on both ready-made and homemade TLMs stresses the importance of local resource production highlighted in the ET5 interview response, *"I use integrated teaching and learning, assessments for learning and development, parental engagement and culturally made teaching and learning materials.*" Workshops that focus on creating effective TLMs should be emphasised in professional development programmes, promoting creativity and resourcefulness among teachers and families in Lesotho's context. This supports findings in the literature about the importance of family engagement in early education, which enhances learning and community involvement (Swart *et al.,* 2016). The advocacy on culturally sensitive approaches suggests that training programmes should incorporate local contexts and resources. By aligning educational practices with the community's cultural values and experiences, teachers may create more relevant and engaging learning environments for children, as stated by Binnawas *et al.* (2019).

The findings also indicated that while some SBAs are already in use, there is room for improvement in how teaching practices respond to children's interests and strengths. Professional development should equip teachers with strategies to observe and adapt their instruction based on individual children's needs, fostering a more personalised learning experience. The call for holistic assessment practices also reflects a need to move beyond traditional methods in early childhood education. DeLuca, Pyle and Lapointe-McEwan (2020) acknowledged that ECCE teachers need to be more prepared and to increase the monitoring and assessment

of children’s learning. Therefore, teachers should be trained to use diverse assessment methods that recognise children’s strengths and learning styles, ensuring a more comprehensive understanding of each child's development.

Overall, the implications of these findings suggest that strengthening SBAs in Lesotho's ECCE settings requires a multi-faceted approach. This includes enhanced training for teachers, cultural integration into teaching practices, active parental involvement, and the development of responsive and engaging learning environments. I believe that speaking to these issues may lead to significant improvements in educational outcomes for young children in Lesotho. In the next section, I merge the themes from classroom lesson observations and semi-structured interviews.

5.3.4 Merging lesson observation and semi-structured interview themes

In this study, merging means combining various themes into a unified theme (Rodger, 2023). I combined the classroom lesson observation and semi-structured themes to holistically understand the participating ECCE settings and the teachers’ teaching and learning processes and experiences. I merged the themes for various reasons, including data triangulation, to dive deeper into the data, to contextualise the observations and participants’ reflections, for validity and reliability, richer data analysis and practical application.

The above combination gave me multiple views on the phenomenon under study. It enhanced the credibility and validity (see Section 4.11) of the research findings by cross-verifying data collected through different methods. The same perspective is supported by Bans-Akutey and Tiimub (2021), who emphasised that triangulation explains how the researcher uses the study's multiple methods to obtain the necessary data and critically analyse the findings, establishing the study's validity and credibility.

Similarly, lesson observations directly viewed teacher-child interactions, instructional strategies and the overall learning environment. However, they may not reflect and capture the participants' underlying motivations, intentions or personal experiences. Semi-structured interviews allowed me to explore these aspects, providing a more

in-depth understanding of the observed behaviours and practices and contextualising observed behaviours or patterns. For instance, in this study, a particular SBA and the intended learning outcomes were observed during the lesson, and semi-structured interviews revealed the reasons behind the choice, the effectiveness of that approach and teachers' understanding of that approach in the ECCE setting. Also, the semi-structured interviews allowed participants to reflect on their practices to gain insights into their decisions, intentions and beliefs that were not obvious during observations.

Lastly, merging themes from different sources was significant in providing me with a richer dataset for analysis. In this instance, I explored patterns, relationships and contradictions between themes and reported experiences, leading to a more nuanced and comprehensive interpretation of the themes. In line with the above reasons, Table 5.4 below shows how the study themes were merged.

Table 5.4: Summary of how observation and semi-structured interview themes were merged

Lesson observation themes	**Semi-structured interview themes**
Classroom arrangement	Philosophical perspectives on learning
Teaching and learning materials	Responsive teaching and learning practices
Children's activities during mathematical learning	Diverse learning materials
Teaching practices/methods	Professional development and support in early education

Based on the above table and as I have already stated in Section 5.2, teaching practices are better understood in connection with classroom arrangement, TLMs used and children's activities in early learning classrooms; hence, they are embedded in teaching practices/methods as the arrows have shown. Therefore, I considered it significant to merge teaching practices from observations with responsive teaching practices from interviews because both themes collected the same data, though in different formats and named the theme: adaptive and responsive pedagogy in early mathematics learning.

Similarly, children's mathematical activities performed during lesson observations revealed teachers' understanding of SBAs which were analysed using philosophical perspectives on learning. This is so because the activities were tailored by teachers in line with the objectives of the lesson prepared by them and also in the classrooms arranged by them. With these ideas in mind, I used children's activities, teaching practices and classroom arrangement during mathematical learning to view teachers' understanding of SBAs. These concerns influenced me to combine these themes, hence the arrow from children's activities to philosophical perspectives on learning. I renamed the theme philosophical foundations of children's mathematical play.

TLMs were explored on the observation sheet and interview guide as stand-alone themes but elicited the same data so I combined them and used contextualising play pedagogy with diverse learning materials as the final theme. Lastly, the professional development and support in early education theme was explored in the semi-structured interviews only; hence, there is no arrow linking it to observation. As a result, it was included in the final themes. The above process resulted in the following overall themes that shaped the findings: philosophical foundations of children's mathematical play, adaptive and responsive pedagogy in early mathematics learning, contextualising play pedagogy with diverse learning materials, and professional development and support in early education. The following section consolidates the findings of the observations and the interviews when the themes were merged.

5.3.5 The Overall Findings of the Study

The general results of the study are presented in line with the following themes: philosophical foundations of children's mathematical play, adaptive and responsive pedagogy in early mathematics learning, contextualising play pedagogy with diverse learning materials, and professional development and support in early education.

5.3.4.1 Philosophical foundations of children's mathematical play

In this study, philosophical foundations of children's mathematical play explore how philosophical perspectives inform and shape children's engagement with mathematics activities. The results in Sections 5.2.4.9 and 5.3.2.1 showed that the participants' understanding of SBAs was unsatisfactory in the participating ECCE settings. This was evident when only one SBA was observed during lesson observations (see Section 5.2.4.9) and when AT1 demanded examples of SBAs, BT2, DT4, FT6 and GT7 needed a definition of SBAs and HT8 needed surety on the correctness of the definition she provided during interviews (see Section 5.3.2.1).

Furthermore, insufficient teachers' understanding was also seen when findings from interviews also illustrated that several teachers were not adequately trained as against only one teacher (AT1) who was trained to teach mathematics through play using SBAs in these ECCE settings. As if it was not enough, the limited knowledge of teachers was also denoted when GT7 said: ***"I do not use them at all"*** (see Section 5.3.2.2), contradicting the findings of lesson observations highlighted in Section 5.2.4.7. These findings indicated that an integrated teaching and learning approach was used in this setting because the teacher, as an adult, planned the lesson, arranged the learning corners, and guided the instruction and learning process – highlighting the adult-led learning aspect of the integrated learning approach. This clearly portrays teachers' minimal understanding of SBAs.

The findings from Sections 5.2.4.9 and 5.3.2.1 reveal a concerning gap in the understanding and implementation of SBAs among teachers in ECCE settings. Observations showed that only one SBA was documented during lesson observations, which suggests a significant lack of engagement with this pedagogical approach. This is further corroborated by interview data, where several teachers

struggled to articulate a clear understanding of SBAs, indicating a fundamental issue in teacher training and pedagogical philosophy. All these contradict Göncü and Main's (2023) connotation that early childhood teachers should have the pedagogical know-how and abilities to instruct while the children are playing, thus redefining teaching in ECE.

This implies that there is a clear disparity between the theoretical underpinnings of SBAs and their actual implementation in these ECCE settings. The interviews indicated that teachers such as BT2, DT4, and FT6 required definitions of SBAs, highlighting a lack of foundational knowledge necessary to implement these strategies effectively. This lack of understanding is critical, as effective teaching through SBAs relies on teachers being well-versed in their principles and practices (MacDonald *et al.* (2021). Moreover, HT8's need for confirmation of her definition illustrates a broader issue of uncertainty and insecurity among teachers regarding their pedagogical approaches. This suggests that professional development and training in SBAs are either insufficient or ineffective, resulting in a workforce that is not fully prepared to engage with contemporary pedagogical strategies.

Furthermore, the data revealed that only one teacher (AT1) had received adequate training in teaching mathematics through play with SBAs, raising questions about the preparation and ongoing support provided to teachers. The limited exposure to effective training programs can lead to a rigid adherence to traditional, teacher-centred instructional methods that were evident in some ECCE settings (see Section 5.2.4.9), stifling innovation and responsiveness to children's learning needs. GT7's statement, *"I do not use them at all,"* starkly contrasts with the observational data, indicating a disconnection between intended pedagogical strategies and actual classroom practices.

The above contradiction suggests that while the educational framework may advocate for SBAs, the realities of teacher knowledge and confidence hinder their implementation (Breathnach *et al.,* 2017; Bubikova-Moan *et al.,* 2019). This gap may further perpetuate a cycle of ineffective teaching practices, where teachers revert to familiar methods due to a lack of understanding of alternative approaches.This was also evident in section 5.2.4.4 when DT4 employed teacher centered learning in the

absence of TLMs and learning corners to facilitate guided play, and the mathematical activities that mediated teaching instruction in this ECCE setting. Therefore, this defies Vygotsky's description of mediational methods, which refers to unique approaches used under certain circumstances (Vygotsky, 1978).

Lastly, the findings also point to the dominance of an adult-led learning framework of integrated teaching and learning approach (see Section 2.6.1), where teachers plan and control the learning environment, as evidenced by the arrangement of learning corners and lesson planning. The reliance on adult-led strategies may limit children's active participation and undermine the very essence of integrated learning, which should ideally balance teacher guidance with child-initiated exploration as illustrated in Figure 2.1, Section 2.6.1. As a result, limited engagement results in children becoming passive recipients of information, leading to decreased motivation and interest in learning (Pyle & Danniels, (2017).

5.3.4.2 Adaptive and responsive pedagogy in early mathematics learning

This theme refers to teachers' adjustment of their teaching practices based on children's needs, interests, and developmental levels specifically on mathematics context. Findings from the observations in Section 5.2.4.9 authenticated that only one SBA (integrated teaching and learning) among teacher-centred, child-centred, guided discussion and demonstration teaching practices was evident in many ECCE settings. The semi-structured results in Section 5.3.2.2 revealed that the following SBAs were used in the eight participating ECCE settings: integrated teaching and learning approach, inclusion of parents, assessment for learning and development, and cultural sensitivity. As a result, I concluded that the following SBAs were used: integrated/combined instruction and learning approach, parental involvement, assessment for learning and development, and cultural sensitivity existed in many ECCE settings that participated in this study.

In line with the above findings, the observation that only integrated teaching and learning approaches were prevalent among various strategies (teacher-centred, child-centred, guided discussion, and demonstration) suggests a significant trend toward holistic education. According to Baroody *et al.* (2019), the integrated teaching

and learning approach emphasises the interconnectedness of subjects and learning experiences, which is critical in early childhood settings where children benefit from contextualised learning. However, the predominance of integrated teaching indicates that while some elements of responsive teaching are present, there may be gaps in fully implementing a more diverse range of strategies.

More so, the limited use of other methods may indicate a lack of teacher training or resources to diversify teaching practices. This could affect the development of critical thinking and social skills in children (VDEECD, 2016), which are often nurtured through more interactive and varied instructional strategies. Therefore, as said by Kalpana (2014), enhancing teachers' skills in child-centred and guided discussion techniques could enrich the educational environment and better address the diverse needs of children.

Finally, the combination of integrated teaching and learning, parental involvement, formative assessment, and cultural sensitivity suggests a comprehensive framework for responsive teaching and learning practices. Overall, the above findings highlight a foundational understanding of responsive teaching and learning in ECCE settings, with clear areas for development to enhance educational practices.

5.3.4.3 Contextualising play pedagogy with diverse learning materials

This theme addresses how teachers select and use materials in consideration of the specific culture, adjusting their pedagogical approaches based on the material available. In this section, I summarise the findings from observations in Section 5.2.2.9 and interviews in Section 5.3.2.3. It was discovered that ready-made and homemade TLMs were available in many ECCE settings that participated in this investigation. Almost all the participants admitted to using both homemade and ready-made TLMs. It was also observed that the government and NGOs provided the ready-made TLMs. In addition, teachers and parents made homemade TLMs to facilitate mathematical play pedagogy in these ECCE settings. The above findings complement Maraisane (2022), who acknowledged that TLMs influence what children learn, how well they learn, and the standard of teachers' instructional strategies and assessment strategies, therefore, play an important part in instruction and learning.

The findings from both observations and interviews indicate a robust use of diverse learning materials across ECCE settings in Lesotho. This supports Maraisane (2022), who asserts that TLMs significantly influence learning outcomes and instructional quality. The combination of ready-made resources provided by external organisations and the creativity of teachers and parents in creating homemade materials underscores the collaborative effort in fostering effective learning environments advocated by Binnawas *et al.* (2019).

The implication of the above findings on diverse learning materials give emphasis to their critical role in enhancing instructional quality and learning outcomes in ECCE settings in Lesotho. It is advised that teacher professional development programs concentrate on content creation and creative applications of TLMs in order to build upon this basis. In order to promote a shared responsibility for children's education, training should also promote cooperation between parents and teachers (MacDonald *et al.,* 2021). This aligns with theories of parent empowerment, which regard parents as partners and experts regarding their children (Swart *et al.,* 2016).

Conversely, the production of homemade TLMs by teachers and parents fosters creativity and resourcefulness that resonate with their children's interests and local contexts to strengthen home-school connections and support children's learning experiences (Swart *et al.,* 2016). Furthermore, fair access to high-quality materials should be the top priority for continued government and non-governmental organisation assistance, guaranteeing that both homemade and ready-made TLMs may be used in all ECCE settings. In the end, this may help children's overall development by making the educational system more effective and inclusive.

5.3.4.4 Professional development and support in early education

Section 5.3.2.4 stated that there was a specific research question that focused on this theme. Therefore, the summary of the findings is taken directly from the same section. Regarding ways of strengthening play pedagogy to enhance mathematics learning using SBAs, the following conclusions can be made – proper training in SBAs is insufficient and needs to be enhanced, more parental engagement is essential, SBAs must be encouraged in the ECCE settings and sponsored quarterly

reflection meetings need to be held for teachers to strengthen their play pedagogy to enhance mathematics learning using SBAs.

The identification that current training in SBAs is inadequate suggests a gap between theoretical knowledge and practical application discussed in Section 5.3.5.1. This may indicate a need for more comprehensive professional development programs that not only cover the fundamentals of SBAs but also provide hands-on strategies and methodologies. This enhancement could involve interactive workshops and training on play-based pedagogy where teachers can be actively engaged to acquire skills in using common materials to teach mathematical concepts like counting or basic operations linking them to mathematical learning outcomes. The mentorship opportunities including peer mentoring, observation of best practices could also assist teachers, and ongoing professional learning communities that focus on the integration of play into mathematics instruction.

In addition, the call for increased parental involvement highlights the critical role that families play in early childhood education. Engaging parents can reinforce the learning that occurs in educational settings and bridge the gap between home and school. This is also justified by (Swart *et al.,* 2016) who maintained that early childhood professionals and schools employing SBA need to uphold parents' abilities, sense of fulfilment and general wellbeing because parents function as their children's first teachers and decision-makers in their education. This could involve strategies such as parent workshops focus on how parents can use play-based strategies at home to support math learning, parent-teacher partnerships providing families with the tools and resources they need to continue the learning outside of the classroom, reinforcing the connection between home and school, communication channels that promote the sharing of SBAs used at school, and resources that encourage families to incorporate play-based learning at home.

Similarly, the necessity for SBAs to be actively promoted within ECCE settings reflects a broader pedagogical shift towards play-based learning (Vogt *et al.,* 2018). Evidence also suggests that play-based learning is more effective than direct instruction or unstructured play (Griswold, 2018; Pyle & Danniels, 2017). This implies that teachers and administrators need to prioritise the integration of SBAs into the curriculum and

ensure that these activities are structured in a way that aligns with learning outcomes in mathematics. It may also require systemic changes in curriculum design to ensure that play is valued as a legitimate form of learning (MoET, 2021).

The recommendation for quarterly reflection meetings points to the importance of continuous professional development and community building among teachers. These meetings could serve as platforms for teachers to share experiences, discuss challenges, and collaboratively develop strategies to enhance their pedagogical approaches. This idea resonates with Swart and Bartlett (2016) who encourage teachers to use the professional development paperwork that allows teachers to exchange and discuss their work with each other in ECCE settings. Such reflective practices can foster a culture of learning and improvement, ensuring that teachers remain responsive to the needs of their children.

Overall, these findings reveal a multi-layered approach to improving early childhood mathematics education through play. Therefore, I believe that by addressing training inadequacies, fostering parental engagement, promoting SBAs, and implementing structured reflection, teachers may create a richer, more effective learning environment that harnesses the power of play in mathematics learning, as suggested by Binnawas *et al.* (2019).

5.4 Chapter Summary

This data analysis chapter provided detailed findings from the observation and interview data using TCA. Four themes from the observation data preceded the discussion of the four themes from the interview findings from each participant (AT1-HT8). A summary of the results was provided at the conclusion of each theme to give an overall insight into the theme. The implications of the results on the quality of mathematical play pedagogy in Lesotho were also given in each phase of analysis. The chapter further merged the themes from the two instruments for triangulation, validity and credibility. The above process ensued with the following themes as the final outcomes: philosophical foundations of children's mathematical play, adaptive and responsive pedagogy in early mathematics learning, contextualising pedagogy with diverse learning materials and professional development and support in early

education. The next chapter will summarise the findings, articulate the suggestions and conclude the study.

CHAPTER SIX: SUMMARY, RECOMMENDATIONS AND CONCLUSION

> Early Childhood intervention programs are among the best strategies for fostering human capital development and ending the cycle of poverty (Osei-Poku & Gyekye-Ampofo, 2017: 73).

6.1 Introduction

The previous chapter examined, interpreted and discussed the findings from the raw data collected through classroom lesson observations and semi-structured interviews conducted with eight participants in ECCE settings. These discussions underlined the key issues, gaps, findings, and lessons learnt from the study. This chapter shows how Strength-Based Approaches (SBAs) are implemented in the context of mathematical play pedagogy and also summarises the findings on how teachers employ SBAs using mathematical play pedagogy in ECCE settings. In addition, this chapter addresses the four research questions to provide a comprehensive overview of the study, major findings and their implications, limitations, recommendations, new knowledge contributions, and conclusion.

6.2 Implementing SBAs in Mathematical Play Pedagogy

In this study, Section 2.8 discussed the following SBAs: integrated teaching and learning approaches, reflective practices, equity and diversity, parental engagement, and assessment for learning and development used as point of reference in exploring mathematical play pedagogy. To recap: SBAs are defined as the methods of teaching that acknowledge and build upon the abilities of the children (MacDonald *et al.,* 2021). As said by AGDE (2022), these approaches create an environment where children's natural curiosity and development are nurtured through engaging, supportive and responsive pedagogy. As a result, in this section, I indicate how SBAs are implemented in the context of mathematical play pedagogy.

- ***Integrated teaching and learning approaches***

An integrated teaching and learning approach in ECE encourages the connection of multiple domains of learning into a coherent experience (Phosisi, 2019). In the context of mathematical play, this means embedding mathematical concepts into other areas of play, such as art, language and science. It can be implemented through cross-curricular connections and project-based learning. For example, children might count and measure ingredients in a pretend restaurant symbolising mathematics in play, while also using language skills to communicate a menu, or creating patterns using art materials. This helps children see the connections between mathematics and real-life contexts.

- ***Reflective Practices***

Reflective practice involves teachers regularly evaluating their teaching strategies, actions, and classroom environments to improve their understanding and responsiveness to children's needs (Swart & Bartlett, 20216). Reflecting on their practice helps teachers assess how effectively they are integrating play-based pedagogy and whether it supports children's mathematical development. It is implemented through self, collaboration and feedback reflections. For example, after a mathematical activity, the teacher might ask themselves how they could adjust the activity to ensure it was more engaging or challenging for the children, or how they could scaffold the children's learning further.

- ***Equity and Diversity***

Equity and diversity in mathematical play pedagogy highlight providing equitable opportunities for all children, regardless of their background, abilities, or needs (ACECQA, 2019). Teachers use diverse materials and strategies to ensure that all children, including those from marginalised or underrepresented groups have access to rich mathematical learning experiences. It is implemented by culturally responsive materials, adaptation of instruction and materials to meet diverse needs and creating inclusive environments. For instance, a teacher might provide a range of counting materials, from objects representing different cultural symbols to tools that are appropriate for children with physical disabilities (e.g., adapted manipulatives or tactile counting materials for children with visual impairments).

- ***Parental Engagement***

Parental engagement in mathematical play focuses in strengthening the connection between the home and the classroom. In the context of mathematical play, this can involve encouraging parents to participate in their children's mathematical development outside of school, reinforcing the learning that happens in the classroom. It is enhance by providing resources for parents, workshops and family events and ongoing teacher-parents communication. For a classroom, a teacher may encourage parents to practice counting, measuring, or sorting objects at home (e.g., counting fruits, sorting laundry by size or colour). Teachers might also invite parents to share their cultural approaches to math or play, further enriching the classroom environment.

- ***Assessment for Learning and Development***

According to VEYLDF (2016), in mathematical play pedagogy, assessment is used to support children's development rather than evaluate them in a traditional sense. It involves observing and understanding children's learning processes through play, with a focus on formative assessment that guides future instruction (Maraisane, 2022). It can be done by observational assessment where teacher observe children as they engage in mathematical play assessing use of mathematical language. Provision of ongoing feedback and documentation can also assist in implementing assessment for learning and development. In a classroom situation, a teacher might observe a child playing with blocks and note how they use spatial reasoning to build a structure. The teacher might then plan future activities to further support that child's understanding of concepts like balance, symmetry, or measurement.

In the next section, I present a summary of my findings in relation to my research questions.

6.3 Summary of the Findings

The study aimed to explore SBAs using mathematical play pedagogy in ECCE settings in the Berea district of Lesotho. Data was collected from seven qualified female teachers and one unqualified female ECCE teacher from five reception classes and three centre bases working with children transitioning to Grade One in

rural and urban areas. Qualitative data was collected through semi-structured interviews and direct classroom lesson observations which were analysed using the TCA method. The classroom lesson observation results identified four themes: classroom arrangement, TLMs, children's activities during mathematical learning and teaching practices/methods.

Similarly, semi-formal interviews revealed the following: philosophical perspectives on learning, diverse learning materials, responsive teaching practices and professional development and support. The above themes were merged in Section 5. 3.4 for various reasons, including eliciting the same data, data triangulation, diving deeper into data, contextualising the observations, participants' reflections, validity and reliability, richer data analysis and practical application. The above process resulted in the following themes: philosophical foundations of children's mathematical play, adaptive and responsive pedagogy in early mathematics learning, contextualising play pedagogy with diverse learning materials and professional development and support in early education. The merged themes in Section 5.3.5 are used to discuss the following research questions.

6.3.1 Research question one

What are the teachers' understandings of SBAs that support mathematical play pedagogy in ECCE settings?

This research question critically examined the teachers' comprehension of the SBAs and mathematical play pedagogy in ECCE settings. In responding to this study question's findings, I drew from Sections 5.3.5.1 and 5.3.5.4 themes of the previous chapter. The literature about SBAs and mathematical play pedagogy was also used to summarise the findings and to respond to this research question. Many studies have also shown that specific characteristics are associated with mathematics play in ECCE settings (see Askew & Venkat, 2020; Beke, 2017; Feza, 2016; Lebihan & Takongmo, 2018) and that SBAs emphasise that developing children's strengths are crucial to their success in school (Galloway *et al.,* 2020; MacDonald *et al.,* 2021).

The study revealed that teachers' understandings of SBAs that support mathematical play pedagogy in ECCE settings appear to be significantly limited. This was evident

when only one SBA was observed during the lesson observations, despite the educational framework advocating such strategies (MacDonald *et al.,* 2021). In interviews, several teachers struggled to define or explain SBAs, suggesting that they did not have a solid grasp of these concepts. For example, teachers like BT2, DT4, FT6, and HT8 all expressed confusion, either requesting a definition of SBAs or seeking confirmation on the correctness of their definitions. This indicates a gap in both foundational knowledge and practical implementation. This implies a lack of sufficient teacher training in SBAs, which is critical to their effective use in mathematical play pedagogy (Gripton & Williams, 2023). With a limited understanding of SBAs, teachers are less likely to employ them effectively in the classroom (Haile & Mohammed, 2017). Therefore, this hinders the pedagogical potential of mathematical play.

The findings denoted that only one teacher (AT1) had received training to teach mathematics through play using SBAs. This raises concerns about the insufficient and ineffective professional development opportunities provided to the teachers in these ECCE settings. Teachers like GT7, who explicitly stated, *"I do not use them at all,"* reflect a significant lack of exposure to or understanding of SBAs, further supporting the conclusion that training and professional development in these pedagogical approaches are inadequate. The scarcity of training and ongoing professional support may contribute to a pedagogical disconnect between the theoretical frameworks advocating for mathematical play (ECMG, 2022) and their practical application resulting in a workforce that is not fully equipped to implement SBA strategies effectively, limiting the potential benefits of play-based mathematics education highlighted by Cohrssen and Niklas (2019).

The study also highlights the disconnect between the theoretical underpinnings of SBAs and their actual implementation in the classroom. While the educational framework advocates SBAs (MacDonald *et al.,* 2021) as a means to facilitate mathematical play, the teachers' practice does not consistently reflect this approach. For instance, in the absence of appropriate training and understanding, teachers tended to revert to more traditional, teacher-centred methods, as seen in lesson observations. Teachers' limited engagement with SBAs suggests that they are more comfortable with familiar methods, which may not align with contemporary, child-

centred pedagogies like mathematical play (Gripton & Williams, 2023). This disconnect can result in a missed opportunity to integrate mathematical play into the learning process, as teachers may unknowingly limit children's ability to explore mathematical concepts through play, instead of focusing on passive learning or rote instruction (Pyle & Danniels, 2017).

Another significant finding was the dominance of an adult-led learning framework, which contrasts with the principles of mathematical play pedagogy that ideally balances teacher guidance with child-initiated exploration (Reikeras, 2020). Observations showed that teachers often controlled the learning environment through lesson planning, organising learning corners, and guiding instruction. This is evident in the integrated teaching and learning approaches observed, where the teacher was responsible for planning, organising, and directing the activities, leading to a more teacher-directed rather than child-initiated learning experience. This over-reliance on adult-led strategies may limit children's active participation in learning (Pyle & Danniels, 2017). As a result, children may become passive recipients of information rather than active agents in their learning process (Ramani *et al.,* 2019), which may reduce their motivation and engagement in mathematical exploration.

Lastly, the contradictions in teacher practices were also highlighted by the study findings. For example, although GT7 claimed not to use SBAs, observations showed that an integrated approach was being used in the classroom, where teachers still facilitated mathematical activities through traditional methods. This contradiction underscores the complexity of teachers' beliefs and practices (Bubikova-Moan *et al.,* 2019). It suggests that while there may be an intellectual awareness of the need for SBAs, the practical application remains challenging due to a lack of understanding and training. This disconnection between teachers' expressed beliefs and their actual practices may further exacerbate the gap in implementing effective mathematical play pedagogy. Teachers may be unaware of how to translate theoretical knowledge into classroom strategies that genuinely support children's mathematical play (Vun, Han & Buell, 2015).

Based on the above inferences, it can be concluded that the first research question is answered. Generally, the understanding of teachers' SBAs supporting mathematical play pedagogy is the least and needs to be enhanced in the participating ECCE settings.

6.3.2 Research question two

What are the existing SBAs supporting mathematical play pedagogy in ECCE settings?

The findings from this study indicate that several existing SBAs are being used in the participating ECCE settings, which support mathematical play pedagogy. As said by Caiels *et al.* (2023), SBAs support a responsive and adaptive pedagogy**,** where teaching practices are adjusted to meet the diverse needs, interests, and developmental stages of children in early childhood education. The main SBAs identified in the study include the following:

6.3.2.1 Integrated teaching and learning approach

The integrated teaching and learning approach was the most prevalent SBA observed across the eight participating ECCE settings. This approach emphasises the interconnectedness of various subjects and learning experiences, which is crucial for early childhood settings where learning is most effective when it is contextualised and holistic (Baroody *et al.,* 2019). According to Trundle and Smith (2017), linking mathematical concepts with other areas of learning (such as literacy, science, and arts), integrated instruction fosters cross-disciplinary connections, encouraging children to explore mathematical ideas in a more dynamic and meaningful way. This holistic approach supports the development of children's critical thinking and problem-solving skills**,** which are foundational for mathematical play (Askew & Venkat, 2020). Through integrated learning, children can engage with mathematics not as isolated content, but as part of a broader, interactive play experience (ECMG, 2022).

6.3.2.2 Parental involvement

Another important SBA identified was parental involvement in the learning process. In many of the ECCE settings, teachers worked to engage parents in their children's learning journeys, either through activities at home or by fostering a partnership between home and school. Parental involvement can significantly enhance children's mathematical play by providing additional opportunities for learning outside of the classroom (Swart *et al.,* 2016). For example, parents can create informal, playful opportunities for children to explore mathematical concepts in daily life – such as through cooking, shopping, or playing games that involve counting or measuring. When parents are involved in the educational process, it strengthens the child's engagement with mathematics and supports their exploration and discovery of mathematical ideas through play in diverse contexts (Rusdawati, 2020).

6.3.2.3 Assessment for learning and development

The use of formative assessment was also highlighted in the findings, where teachers used ongoing assessments to understand children's learning progress and adjust their teaching strategies accordingly. Formative assessments, such as observations and informal check-ins, allow teachers to monitor how children engage with mathematical play (VDEECD, 2016). This is in line with the ECMG (2022) which maintained that in formative assessment, teachers engage children in a variety of mathematics-related activities across different areas of learning. By recognising children's interests and challenges in real time, teachers can adapt activities to suit the children's developmental stages (DEECD, 2012). For example, if a child is struggling with counting, teachers can provide more hands-on, playful opportunities to practice these skills, such as using blocks or toys for counting games. This approach aligns with the principles of responsive pedagogy**,** which emphasises the importance of adjusting teaching strategies to meet the individual needs of children (Breathnach *et al.,* 2017), thereby making mathematical play more accessible and engaging (Ramani *et al.,* 2019).

6.2.3.4 Cultural sensitivity

The study also identified cultural sensitivity as an important SBA. Teachers in the participating settings were conscious of the diverse cultural backgrounds of the children and made efforts to incorporate culturally relevant materials and activities into the curriculum (Swart *et al.,* 2016). Culturally sensitive teaching practices can enrich mathematical play by connecting mathematical concepts to the real-world experiences of the children (ACECQA, 2019). For example, in communities where traditional games involve counting or patterns, teachers can incorporate these local activities into the curriculum, allowing children to see the relevance of mathematics in their everyday lives. Culturally relevant materials, such as stories, games, or toys that reflect the children's backgrounds, can help to make mathematical play more engaging, meaningful, and accessible. Moreover, cultural diversity provides a rich backdrop for exploring mathematical ideas such as symmetry, measurement, and spatial relationships in various cultural contexts.

The existing SBAs identified in this study offer a comprehensive framework for enhancing mathematical play pedagogy in ECCE settings. However, the findings also suggest that there are gaps in the diversity of SBAs being used. For example, while the integrated teaching and learning approach was widely observed, other teaching strategies like child-centred or guided discussion approaches were less prominent, indicating the need for more variety in teaching practices.

Therefore, to further expand the range of SBAs through mathematical play, it would be beneficial for teachers to receive training that focuses on child-centred strategies, where children are encouraged to take the lead in their learning. The use of guided discussions**,** where teachers ask open-ended questions to prompt mathematical thinking, could also be integrated more systematically into the curriculum. Also, there is a need for ongoing professionals who help teachers understand how to integrate diverse pedagogical approaches effectively. This could include training on how to use guided discussions or other methods that promote active learning and critical thinking in mathematical play.

In line with the above discussion, it can be concluded that the second research question is answered. In short, four SBAs existed in the participating ECCE settings although teachers need more understanding of these approaches.

6.3.3 Research question three

How do TLMs facilitate mathematical play pedagogy using SBAs in the ECCE settings?

The findings from this study underscore the essential role that TLMs play in facilitating mathematical play pedagogy through the use of SBAs in ECCE settings. Through both observational data and teacher interviews, it became evident that the selection and use of a diverse range of TLMs significantly enhance how mathematical play is integrated into early childhood learning environments.

The study found in section 5.3.5.3 that ready-made and homemade TLMs were commonly used across the ECCE settings. Ready-made materials were often provided by government and non-governmental organisations (NGOs), while homemade materials were crafted by teachers and parents to meet the specific needs of the children (ACECQA, 2019). This dual approach of combining external resources with locally produced materials reflects a collaborative effort to create rich, dynamic learning experiences for children (Binnawas *et al.,* 2019).

This also aligns with MacDonald *et al.* (2021) who indicated that effective learning requires cooperation between teachers, parents and children to successfully implement SBAs in ECE programmes. TLMs, whether purchased or homemade, offer children hands-on, tactile experiences that are crucial for mathematical play**.** For example, homemade materials like counting beads, blocks, or shapes often allow children to engage in playful activities like sorting, counting, and patternmaking, which are foundational to early mathematical development.

In addition, TLMs also play a critical role in contextualising pedagogy to reflect the children's cultural backgrounds and local contexts (Lee, 2015). Frimpong (2021) maintains that the choice and use of TLMs are often based on the specific developmental needs and interests of the children as well as the cultural relevance

of the materials. Teachers use both ready-made and homemade TLMs to adapt their teaching approaches to the specific classroom environment and cultural setting in this study. By selecting TLMs that resonate with the children's cultural context and developmental stages, teachers make mathematical concepts more meaningful and accessible (Maraisane, 2022)**.** For example, materials that reflect local objects, stories, or games help children see the real-world relevance of mathematics, fostering a more engaged and active approach to mathematical play. This contextualisation helps to create a learning environment where children feel their everyday experiences are integrated into their mathematical learning (Rusdawati, 2020).

The study also highlighted the significance of collaboration between teachers and parents in the creation and use of TLMs. Homemade materials, developed by both teachers and parents serve not only as an educational tool but also as a means of strengthening the home-school connection (Swart *et al.,* 2016). Parents' involvement in creating learning materials that reflect their children's needs and interests underscores the idea that parents are partners in their children's education. This collaborative approach supports the idea of shared responsibility for children's education by (Swart *et al.,* 2016), where parents and teachers work together to create a learning environment that is tailored to the children's needs. For instance, parents can create simple, cost-effective materials at home that align with what is taught in the classroom, thus reinforcing mathematical play across both settings. This also contributes to the creativity and resourcefulness needed to support mathematical learning, helping children to make connections between home and school**.**

Moreover, the diverse use of TLMs is linked to enhancing instructional quality and improving learning outcomes in mathematical play (Maraisane, 2022). By using varied materials, teachers can adjust their teaching methods to accommodate different learning styles and developmental levels. The combination of homemade and ready-made materials also ensures that the learning environment is rich, flexible, and responsive to children's individual needs and interests (Binnawas *et al.,* (2019). As Maraisane (2022) and other scholars emphasise, the quality and variety of TLMs have a direct impact on both teaching and learning outcomes. In the context

of mathematical play, TLMs allow for hands-on engagement**,** which is key to children's early mathematical development (Griswold, 2018). This supports the notion that a rich and diverse range of materials is necessary for effective pedagogical practice, especially when aiming to foster exploration and problem-solving in young children (Beke, 2017).

The findings point to the need for ongoing teachers' professional development in the creative use of TLMs. Teachers should be encouraged to develop their own materials or adapt ready-made resources to better suit the needs of their children. This could be integrated into teacher training programmes to foster greater creativity and flexibility in the use of resources. Teacher professional development programs should place a strong emphasis on both content creation and the pedagogical application of TLMs. These programs should also encourage teachers to work collaboratively with parents, recognising their role in supporting children's mathematical play through the use of locally relevant materials. In addition to teacher training, continued support from government and NGOs is essential to ensure fair access to high-quality materials. This would guarantee that all ECCE settings have the resources they need to create inclusive, equitable, and effective learning environments (Rusdawati, 2020) that promote mathematical play.

In line with the above discussion, an inference can be made that the third question was answered and in general, TLMs were available and used as intended to facilitate mathematical play pedagogy in ECCE settings.

6.3.4 Research question four

How do SBAs support and strengthened mathematical play pedagogy in ECCE settings?

The findings of this study suggest several key strategies for strengthening SBAs to better support mathematical play pedagogy in ECCE settings. These strategies are rooted in addressing gaps in teacher training**,** enhancing parental involvement**,** actively promoting SBAs within ECCE settings, and providing structured opportunities for teacher reflection. Below, I summarise the suggestions based on the study's findings in section 5.3.5.4:

- ***Enhancing teacher training in SBAs***

A major finding of this study is that the current training in SBAs for teachers is insufficient and needs to be improved. This limits the effective implementation of mathematical play pedagogy in ECCE settings. The gap between theoretical knowledge and practical application of SBAs, as highlighted in Section 5.3.5.1, indicates the need for more comprehensive professional development programs. To address this gap, professional development should focus on both theoretical understanding and hands-on strategies for using SBAs in mathematical play. Workshops that provide interactive, play-based activities could help teachers build confidence in using materials like blocks, counters, and number games to teach foundational mathematical concepts such as counting, sorting, and basic operations. Additionally, peer mentoring and mentorship opportunities should be encouraged, where more experienced teachers can model effective SBA strategies. Continuous professional learning communities that meet regularly to focus on integrating play into mathematics instruction would also support teachers' ongoing development.

- ***Increasing parental involvement***

The findings also emphasise the critical role of parental engagement in reinforcing the learning that occurs in ECCE settings. Engaging parents not only strengthens the bond between home and school but also ensures that children receive consistent support for mathematical play both in the classroom and at home. Additionally, parent-teacher partnerships advocated by (Swart *et al.,* 2016) could be developed to provide families with the resources, tools, and ideas to continue supporting mathematical play outside of the classroom. Communication channels between parents and teachers should be established to regularly share SBAs used in the classroom, allowing parents to reinforce those strategies at home. This would help bridge the gap between formal education and home learning, fostering an environment where children’s mathematical learning is supported holistically.

- ***Promoting SBAs within ECCE settings***

The study highlights that SBAs should be actively promoted within ECCE settings to ensure that play-based learning is prioritised in the curriculum. Play-based pedagogy is increasingly recognised as an effective way to teach young children foundational

mathematical concepts (Askew & Venkat, 2020), as it allows them to explore and experiment in ways that structured instruction cannot (Pyle & Danniels, 2017). Literature indicated that professionals, including teachers in ECCE settings, are encouraged to use SBAs that focus on what works to continue developing the child's abilities to support play pedagogy (MacDonald *et al.,* 2021).

It is essential for teachers and administrators to prioritise SBAs in their planning and curriculum design. Curriculum changes should be made to explicitly value play as a legitimate form of learning. Teachers should be encouraged to integrate SBAs into their daily routines and to structure play activities in a way that aligns with mathematical learning outcomes. This could involve creating environments where children have ample opportunities for exploratory play (Griswold, 2018), such as with manipulatives or number games, to deepen their mathematical understanding in a context that feels natural and enjoyable.

- ***Implementing quarterly reflection meetings***

A key recommendation from the study is the implementation of quarterly reflection meetings for teachers. These meetings would serve as structured opportunities for ongoing professional development and collaboration, allowing teachers to share their experiences, discuss challenges, and refine their strategies for teaching mathematics through play. Similar views were discovered by Swart and Bartlett (2016), who encouraged teachers to use reflection meetings for professional development where teachers may exchange ideas and reflect on one another's work in the ECCE settings. This further supports the earlier findings of VDEECD (2016), which acknowledged that reflection and critical evaluation practices are central to the work of early childhood professionals – preserving a culture of learning in the service, setting achievable goals and networking are associated with ongoing development**.** These results imply that the absence of reflection meetings may negatively impact teachers' and children's performance in early learning settings.

Regular reflection meetings should be scheduled to encourage teachers to discuss the successes and challenges they face when using SBAs. These meetings can help foster a culture of continuous improvement by creating a space for teachers to reflect on their practices, share insights, and collaborate on new strategies. This could

involve group discussions about what is working well in terms of play-based learning and mathematics, as well as problem-solving sessions to address difficulties in implementation. Creating a supportive professional community will ensure that teachers remain responsive to the evolving needs of their children and continue to grow in their ability to effectively use SBAs.

Therefore, the fourth research question was addressed through these findings. Generally, four thematic areas were identified for strengthening SBAs using mathematical play pedagogy in the ECCE settings. In the following section, I discuss the aim of the study in line with the research questions responded to in the above section.

6.4 The Aim of the Study

The present study intended to explore teachers' strength-based teaching practices to support children's mathematical play pedagogy in Lesotho's Berea ECCE settings (see Section 1.5.1). In light of the discussions in Sections 6.3.1, 6.3.2, 6.3.3 and 6.3.4, it can be concluded that this aim was achieved. The SBAs supporting mathematical play pedagogy in ECCE settings were elicited. The study successfully identified and explored the potential of SBAs to enhance mathematical play pedagogy, highlighting key strategies like integrated learning, parental involvement, assessment for learning, and cultural sensitivity. These strategies align with the principles of strength-based education and could support children's mathematical development if implemented effectively.

However, the implementation of SBAs was hindered by gaps in teachers' understanding and insufficient training, which means that the practical application of these approaches was not as widespread or effective as the study's aim would suggest. There is a clear need for better teacher training, ongoing professional development, and support for fully realising the potential of SBAs in mathematical play pedagogy.

In summary, while the study explored and identified strength-based strategies that can enhance mathematical play pedagogy, the lack of effective implementation due to teacher knowledge gaps means that the aim was only partially achieved. More

emphasis on teacher development and support is needed to fully realise the potential of SBAs in ECCE settings.

6.5 New Knowledge

The study's area of focus was ECCE settings called the pre-primary level in Lesotho. As highlighted in the previous chapters, this research focused on exploring the SBAs using mathematical play pedagogy in specific ECCE settings. This focal area created fresh additions to the research on mathematics education and early childhood by enhancing the understanding of SBAs.

The study explores the SBAs in ECCE considering children's unique strengths, talents and skills, and enhancing their motivation, engagement and general mathematics learning outcomes. The study shifted from research on deficit-based approaches to strength-based ones using play pedagogy in ECCE settings – most studies in this area have focused explicitly on the challenges or deficit-based approaches (Akinrotimi & Olowe, 2016; Bubikova-Moan *et al.,* 2019; Diale & Sewagegn, 2021; Feza, 2016; Haile & Mohammed, 2017; Jensen *et al.,* 2019; Ntumi, 2016; Solare-Rojas *et al.,* 2022; Solis & Isoda, 2022; Vogt *et al.,* 2018). This shift added more to the scarce literature identified in Chapter Two (see Section 2.1) because it explored SBAs using mathematical play pedagogy in Lesotho ECCE settings from a positive perspective.

In the Lesotho context, there is not much research on this level of education and the primary, secondary and tertiary levels have received greater attention. Enhancing the clarity of mathematics instruction in early childhood might mitigate the anxiety associated with mathematics learning in higher grades or secondary schools – it could improve children's mathematics performance in Lesotho schools, which has been steadily declining (MoET, 2016).

The MoET (2016) further indicates a decline in the standard of instruction in mathematics at all levels, including ECCD. Given how little study has been done on this issue in Lesotho, the best approaches to integrate mathematical play into instructional strategies, for curriculum development and learning settings may be deduced from this research. In addition, by promoting positive perceptions of

mathematics, this research provides insights into fostering good attitudes towards mathematics from a young age by examining SBAs. It can cover methods for fostering a growth mindset in children, lowering math anxiety, and increasing children's mathematical confidence.

The methodology employed in this study provided a major input to new knowledge during data collection. For instance, teachers agreeing to be observed constitute new knowledge because classrooms are usually regarded as no-go areas. In addition, reflections on what transpired during lesson observations were made at the end of each lesson and this contributed to a learning cycle during the research process. Another contribution was evident during semi-structured interviews when most participants did not know about SBAs and requested the researcher to explain them and to give examples (see Section 5.3.2.1). This emerged as new knowledge brought in because the researcher defined the SBAs and provided examples to participants.

In terms of theory, social constructivism correlates explicitly with SBAs in mathematical play pedagogy in the following ways: they both advocate collaborative and individualised learning, positive reinforcement, motivation and engagement, and an awareness of the ZPD and strengths when they are properly integrated. This contributes to the new knowledge because the study findings urge mathematics teachers to use well-informed, largely strength-based lessons rather than teacher-dominated ones.

Lastly, and most importantly, exploring this topic promotes inclusive education. The validated findings from the investigation into adapting mathematical play pedagogy and SBAs for various children could ensure fair access to mathematics learning – the study offers insights on how to accommodate individual learning requirements, cultural backgrounds and varying ability levels to achieve SDG four of the 17 goals by 2030 (see Section 1.1). In the next section, the recommendations for the study are discussed in line with the study's findings.

6.6 Study Recommendations

Based on the findings summarised in this study, several practical recommendations can be drawn to strengthen the use of SBAs to support mathematical play pedagogy in ECCE settings. These recommendations are aimed at addressing the key gaps identified in teacher training, the use of SBAs, and the overall support for play-based mathematical learning. Here are the recommendations:

6.6.1 Enhancing teacher training and professional development

As the study found that teachers' understandings of SBAs were limited, there is a need for targeted, more robust teacher training programs. Professional development should focus on both the theoretical foundations of mathematical play pedagogy and practical, hands-on strategies for implementing SBAs. Training should include workshops on integrating SBAs into daily teaching, using play-based materials such as manipulatives, and assessing children's mathematical thinking through observation and formative assessment.

In addition, peer mentoring and collaboration are needed. Teachers should be encouraged to work with more experienced peers through mentoring programs. Experienced teachers can model effective practices and provide feedback on how to incorporate SBAs into teaching. Collaborative learning environments, such as regular professional learning communities (PLCs), would allow teachers to share experiences and refine their practices in using SBAs.

Finally, ongoing reflection and evaluation are essential. Establish quarterly reflection meetings, as suggested by the study, to provide teachers with opportunities to reflect on their practices, share challenges, and collaboratively develop new strategies for using SBAs. These meetings should focus on evaluating the effectiveness of current teaching methods and finding ways to better integrate mathematical play into classroom activities.

6.6.2 Increasing parental involvement

Parental involvement in children's learning is critical for reinforcing mathematical play outside the classroom as a result needs to be strengthened. Teachers should work closely with parents to share strategies, materials, and activities that can be used at home to support children's mathematical development. This could involve providing parents with simple, engaging mathematical activities, for instance, games and counting tasks that they can do with their children.

Parental training and provision of resources are significant. Create workshops or provide informational resources to parents on how they can support mathematical play at home. These resources should include ideas for play-based activities that align with the mathematical learning goals in the ECCE setting, thereby creating a seamless connection between home and school. Also, to develop regular communication channels between teachers and parents, such as newsletters or digital platforms, to keep parents informed about what their children are learning in terms of mathematical play and SBAs. This will help ensure that parents are aware of the pedagogical approaches used in the classroom and can reinforce these concepts at home.

6.6.3 Promoting SBAs within ECCE settings

The study recommends prioritisation of play-based learning by ensuring that the curriculum in ECCE settings explicitly values play as a legitimate and essential form of learning. Teachers should be encouraged to create environments where children have ample opportunities for exploratory play that integrates mathematical concepts through manipulatives, number games, and hands-on activities.

Curriculum integration of SBAs is also paramount. Therefore, the study encourages the integration of SBAs across all areas of the curriculum, not just in mathematics. Teachers should be guided on how to embed formative assessments into play-based activities that align with mathematical goals (ECMG, 2022). This integration allows for a more holistic learning experience and helps teachers better track children's progress in real time.

Holistic and child-centred approaches are also crucial. Moving away from an overly adult-led teaching style, it is important to balance teacher guidance with child-initiated exploration. Teachers should create a more flexible, responsive classroom where children are encouraged to take the lead in their learning. This may involve guided discussions or open-ended questions that prompt children to think critically about mathematical concepts in their everyday lives.

6.6.4 Strengthening the use of TLMs

The creative use of TLMs should be encouraged. Teachers should be trained not only to use ready-made materials but also to create or adapt their own materials to suit the developmental needs and interests of the children. Workshops that provide teachers with the skills to make their own TLMs, such as using everyday objects for counting, patterns, or sorting activities, could be beneficial.

Cultural sensitivity in material selection should also be considered. TLMs should reflect the cultural backgrounds of the children in the classroom, making mathematics more relevant and engaging for them. Teachers should be encouraged to incorporate culturally appropriate materials like local games, objects, or stories to bridge the gap between children's home experiences and formal education.

Collaborative material creation is also important. Teachers and parents should work together to create locally relevant materials that reflect the children's environment and everyday experiences. This collaboration not only strengthens the connection between home and school but also fosters a sense of ownership over the learning process.

6.6.5 Support for curriculum and policy alignment

Advocacy for policy change would ensure that the national or regional educational policies prioritize the use of SBAs and mathematical play in ECCE settings. Policymakers should be encouraged to provide frameworks that explicitly support the integration of SBAs and play-based pedagogy, ensuring that these strategies are seen as essential components of early childhood education.

The support for equity in resource distribution is essential to verify that all ECCE settings, regardless of their socio-economic context, have equal access to high-quality, age-appropriate learning materials. Government and non-governmental organisations (NGOs) should continue to provide support, ensuring that both ready-made and homemade materials are available to teachers and children.

6.6.6 Fostering a culture of continuous improvement

The study suggests feedback loops and teacher reflection. The study highlighted the need for teachers to engage in reflective practices. Reflection should not be a one-time event but an ongoing process where teachers regularly assess their teaching strategies, understand their strengths, and identify areas for improvement. Feedback from peers, supervisors, and even children can play a crucial role in this process.

Next, I discuss the limitations of my study.

6.7 Limitations of the Study

Every research study has advantages and disadvantages of its own. This research is not an anomaly. The results cannot be generalised due to the qualitative nature of this study. The Berea district served as the study's location and eight teachers from ECCE settings in Lesotho were sampled. It was noted that the eight teachers' and eight schools' cultures did not accurately reflect the culture of the entire population of the ECCE settings in the Berea district, other districts of Lesotho, or teachers in general. Still, it offered some useful information on how ECCE teachers can use SBAs to enhance mathematical play pedagogy in their settings.

Another drawback of the current research is that information about SBAs in ECCE settings was gathered using classroom lesson observations and semi-structured interviews, which I consider inadequate. Using both in-depth interviews with the ECCE teachers and classroom lesson observations would have been a more balanced approach. As a researcher, having more in-depth interviews and classroom observations would have provided me with a better understanding of the teachers' pedagogical approaches. The observer’s reports of classroom observation practices and in-depth interviews would have been more accurate and complemented each

other more than the teachers' shallow reports of semi-structured interviews about teaching methods.

Furthermore, another constraint experienced during data analysis was that I discovered pictures taken of children's activities during GT7's classroom observation could not be retrieved on the device used. I recalled taking the pictures during the lesson but realised they might not have been saved on the device because they were nowhere to be found. I ended up authenticating the findings in Section 5.2.3.7 by providing a snapshot of the lesson plan instead of pictures of children's activities.

Again, another significant barrier was the expense of repeatedly contacting the participants to confirm and schedule visits. The good news is that I was able to finish the study because of the help I got from management leaders. For instance, the assistance of the Berea Education department, and connections I made at the MoET with people who had some administrative power.

Finally, if I were to do this study again, I would resort to an interventionist study instead of an exploratory study because the literature shows that little is known about play and learning environments in Lesotho ECCE settings (World Bank, 2018). This makes me curious and overwhelmed by many questions such as: What "little" is known about play? Moreover, how do teachers prepare the learning environments if "little" is known about the learning environment, especially when research shows that the learning environment determines good mathematics pedagogy in early educational settings (Gripton & Williams, 2023). All these point to the need for interventionist studies.

6.8 Areas of Future Research

This study explored SBAs using mathematical play pedagogy in Lesotho ECCE settings. This study raised more opportunities for research in the field of ECCE, such as on the curriculum, play pedagogy and the teachers' pedagogical content knowledge. Moreover, studies on teachers' mathematical play pedagogy concerning SBAs can be expanded to include more teachers instead of the small sample of eight used in this study.

Further research is needed to explore how these approaches can be adapted and scaled in different regions of Lesotho and in varying socio-economic contexts. Additionally, longitudinal studies examining the long-term impact of strength-based mathematical play on children's academic achievement and overall development would provide valuable insights into the sustainability and broader applicability of these educational strategies.

Finally, it is of vital importance that attention be given to the impact of SBAs on children in ECE and how they respond to their teachers' use of these approaches. Evidence shows that additional research is required to expand the body of information regarding the specifics of SBAs, their effects on users' and caregivers' wellbeing and quality of life, and the results obtained (Caiels *et al.,* 2023). This will assist policymakers, agencies and practitioners to make scientifically proven, evidence-based decisions. Also, another area of research could be exploring the impact of easily accessible resources to facilitate teaching and learning using SBAs in early childhood.

6.9 Personal Reflections

I resumed my academic journey with the University of Free State in 2006 when I enrolled in an educational psychology degree programme specialising in support teaching. In 2009, I was admitted into the Bachelor of Education (BEd) Honours degree in support teaching. Upon completing my honours degree, I shifted to the University of South Africa and enrolled in a Master of Education (MEd) programme specialising in inclusive education in 2012. In 2019, I was promoted to the ECCD inspectorate department of the MoET (see Section 4.6). This promotion served as inspiration and motivation. It aroused my curiosity, and I enrolled in the Doctor of Philosophy (PhD) in Early Childhood Development and Learning programme in 2022 with the University of Free State. This was for my professional development, to become more knowledgeable and to deliver my best in my new position. Hence, this study explored SBAs that use mathematical play pedagogy in Lesotho ECCE settings from a positive perspective. This point of view contrasted with the deficit view of learning (Caiels *et al.,* 2023) that is commonly researched, leading to a

perpetual cycle of negative expectations blocking opportunities for mathematics learning (MacDonald, 2018).

Embarking on this study was very difficult and needed resilience, determination and commitment against all odds. The overwhelming challenges experienced formed part of the research journey. One such challenge was balancing the time for my studies, family and work – this was not easy at all because research activities require plenty of time. In addition, completing and fulfilling family responsibilities was also a significant issue, not to mention work-related deadlines that were mandatory to meet. It was as if my life had taken a new turn untraveled by others. For instance, I cannot forget the situation where I found out that I had nine hours until I had to present my research proposal to a Specific Interest Group. I nearly gave up, but with the encouragement and support I got from my supervisor, I persisted and learnt that "*Rome was not built in a day,"* instead, it was built stone by stone and with persistence and perseverance, it stood tall and mighty. As a result, I am forever thankful for the support.

In the research process, every step of the way was as important as the one before because a journey of thousand miles begins with a single step (Haimene, 2023). Indeed, this learning curve was marked by exciting achievements within daunting challenges. I learnt a lot during this research process. My interpersonal skills, values and attitudes, particularly patience, tolerance, persistence and perseverance in working with other people, were further enhanced because some of the participants I came to know for the first time after taking up this study.

It was not easy to work with others as some changed interview appointments more than twice, and patience and persistence helped me overcome this challenge as I realised that participants had their responsibilities to fulfil. Therefore, rescheduling the appointments impacted my research plan negatively. In addition, some of the sampled ECCE settings were rural, so the face-to-face semi-structured interview method required me to move to their venues. It took me over an hour to get to one of the settings on foot. I had to adjust to fit the situation. However, tolerance, perseverance and negotiations with participants carried me through to the end of the study.

Overall, this study broadened the scope of my knowledge regarding the literature, theoretical framework and research methodology. For instance, this study allowed me to critically engage with various literature from a positive perspective (SBAs) over the deficit-based approaches I employed at the master's level. More so, in my previous study, I developed a conceptual framework; for this study, I decided to use a theoretical framework to become skilled in both aspects.

Most significantly, this study's tools and research methodology differed from those used previously. All these were done primarily to broaden my research horizons for a better scholarly experience. With the experience obtained in this study, I see myself becoming an optimistic and genuine researcher grounded in various research skills to fulfil the saying that *"an expert knows all the answers if you ask the right questions."*

Lastly, I learnt that maintaining a good relationship with study participants was paramount for the successful completion of the study regardless of one's position. This is what happened in this study. I humbled myself before my participants keeping my position aside. I learnt that treating people with respect and dignity at all times is not only a requisite but also a need in life because tomorrow is a mystery.

6.10 Conclusion

This study explored the potential of strength-based approaches in conjunction with mathematical play pedagogy within the context of Lesotho's Early Childhood Care and Education (ECCE) settings. The findings underscore the effectiveness of leveraging children's existing strengths, particularly their curiosity, creativity, and problem-solving abilities, to enhance engagement and learning in early mathematics.

The strength-based approach, which focuses on identifying and nurturing children's inherent capabilities, was found to be a powerful tool in fostering positive attitudes towards mathematics and boosting children's confidence in their cognitive abilities. When combined with play-based pedagogical strategies, mathematical concepts were more accessible and engaging for young learners. By integrating familiar cultural practices and local resources into play, children were able to connect new

mathematical concepts to their everyday experiences, thus facilitating deeper understanding.

The study also revealed several critical factors for successful implementation, such as the importance of teacher training, adequate resources, and a supportive learning environment. Teachers who were well-trained in strength-based and play-oriented methodologies were better equipped to recognise and build on children's individual strengths, leading to more inclusive and effective teaching practices.

Moreover, the research highlighted the need for greater policy support and infrastructure improvements to sustain these approaches across diverse ECCE settings in Lesotho. Despite challenges, such as limited resources and large class sizes, the study demonstrates that with targeted interventions, significant progress can be made in improving early mathematical literacy among children.

In conclusion, integrating strength-based approaches and mathematical play pedagogy in Lesotho's ECCE settings offers promising opportunities to enhance early childhood education outcomes. This approach not only strengthens children's mathematical skills but also promotes holistic development by fostering self-confidence, creativity, and critical thinking.

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APPENDICES

Appendix A: Ethical Clearance

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA
UFS UV

GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

27-Nov-2022

Dear Mrs Masekhohola Nyamela

Application Approved

Research Project Title:
Exploring strength-based approaches using mathematical play pedagogy in Lesotho early chilhood care and education settings.

Ethical Clearance number:
UFS-HSD2022/0971/22

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Outcome: Approved

Please note:

Please be mindful of the loss of work time of participants when conducting the research and mitigate appropriately.

There is a spelling error in the protocol title.

Yours sincerely

Dr Adri Du Plessis
Chairperson: General/Human Research Ethics Committee

Adri Du Plessis
Digitally signed by Adri Du Plessis
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Appendix B: Letter to the Department of Education

Ha Ramonaheng

P.o Box 863

Teyateyaneng

Berea 200

Lesotho

The District Education Manager

Teyateyaneng

Berea 200

Lesotho

RE: PERMISSION TO CONDUCT SCHOOL-BASED RESEARCH IN BEREA DISTRICT

Dear Sir/ Madam

I hereby request permission to carry out my research in your district. My name is Mary Masekhohola Nyamela. I am a student at the University of the Free State and presently enrolled for the Doctor of Philosophy with a specialisation in early childhood development and learning. To complete the requirements for the degree, I have to become acquainted with aspects of doing research that are related to the area of my specialisation. My research topic is ***exploring the strength-based approaches using mathematical play pedagogy in Lesotho early childhood care and education settings.*** I plan to work with eight reception class teachers in your district if possible. The participation of these teachers will include classroom observations and the answering of semi-structured interview items.

If permission is granted, the researcher will hold a meeting with the teachers to explain the objectives of the research and all its related activities that the participants are likely to be involved in. All clarity-seeking questions will be answered. The research will not interfere with tuition and will only be conducted at a time convenient to the teachers. The teachers will be prioritised to set time for classroom observations and also time for answering an hour of interview questions.

If you allow me to use your district as a site for this research, I will share the research findings with your office and the participating schools. The schools' and participants' identities will be written under pseudonyms. Participation in this research is completely voluntary and withdrawal of participation at any stage of the research will be permissible at no penalty.

I thank you in anticipation for your pivotal role in helping me. I hope to hear from you soon. You are welcome to contact me for any issues related to my research. My phone numbers are 58574193 or 63113226.

Yours faithfully

Mrs Nyamela Masekhohola Mary

Appendix C: Permission Letter from the Department Of Education

MINISTRY OF EDUCATION AND TRAINING

P.O. BOX 561 BEREA 22/06/2022

Ethics Department

University of the Free State

Bloemfontein

Dear Sir/ Madam

RE: PERMISSION TO CONDUCT A RESEARCH STUDY IN THE BEREA SCHOOLS

MASEKHOHOLA NYAMELA: 2006069534

Your request to carry out research study 'Exploring the strength based approaches using mathematical play pedagogy in Lesotho early childhood care and education settings' bears reference.

Your request has been approved on the following conditions:

- Teacher participation should not be mandatory
- Teaching and learning should not be interrupted

Kind regards

Mopei Selikane (Mrs)

District Education Manager – Berea

Mobile : 58855708

Appendix D: Permission Letter from School Principal (Sample)

Berea
Lesotho

3rd August 2022

RIMS DEPARTMENT
University of the Free State
Bloemfontein 9300

Dear Sir/Madam

RE: PERMISSION TO CONDUCT A RESEARCH STUDY IN BEREA SCHOOLS.

This letter serves to grant permission to Masekhola Nyamela: 2006069534, in respect to conduct research on "Exploring the strength based approaches using Mathematical play pedagogy in Lesotho Early childhood care education settings." Request has been approved as per the Ministry of Education conditions.

Teacher participation and appropriate ethics considerations be followed teaching and learning should not be interrupted.

Kind Regards

Appendix E: Letter to Participants

CONSENT LETTER FOR RECEPTION TEACHERS AT BEREA DISTRICT

Dear Sir/ Madam

My name is Mary 'Masekhohola. I am a student at the University of Free State and am presently enrolled for a Doctor of Philosophy in Early Childhood Development and Learning. To complete the requirements for the degree, I have to become acquainted with aspects of doing research that will involve teachers in some of the Berea schools. My research will explore ***strength-based approaches using mathematical play pedagogy in Lesotho early childhood care and education settings***. I wish to invite you to participate in this research.

Should you decide to participate in this research, I will request to observe you in your teaching and learning of mathematics and also to audio record you during an hour-long interview. The main objective is to collect data related to strength-based approaches using mathematical play pedagogy in your reception class. Your identity and that of your school will not be revealed. In reporting the findings of this research, pseudonyms will be used, and the findings will be aggregated. Given your participation, the results of this research will be made available to you and your school. Your participation in this research may improve the teaching and learning of mathematics in the Berea district of Lesotho. An observation will be done during teaching and learning while an interview will be conducted between 14H00 and 15H00 to minimise interference with the teaching time in your school. Before the commencement of the research, the researcher will convene a meeting with all participants to explain the study's objectives and clarify other issues relating to this research. You can withdraw your participation at any research stage without penalty. After reading this letter, please complete the attached consent form and return it to the researcher.

Thank you in advance for reading this letter, and I hope to hear from you soon. If you have questions about this research, call me at 58574193.

Yours truly

Mrs Mary Masekhohola Nyamela

Appendix F: Participants' Consent Form

CONSENT TO PARTICIPATE IN THIS STUDY

I, the undersigned,

_____ (*participant's full names to be included*), (the "**Participant**")

confirm that I voluntarily agree to participate in the research study referred to as

EXPLORING STRENGTH-BASED APPPROACHES USING MATHEMATICAL PLAY PEDAGOGY IN LESOTHO EARLY CHILDHOOD CARE AND EDUCATION SETTINGS.

and which Study is being conducted by

'Maseabhola Mary Nyamela
(*insert the name of the researcher*), (the "**Researcher**").

I, the undersigned Participant, further confirm that–

1. the Researcher has explained the nature, procedure, potential benefits and anticipated inconvenience of my participation in the Study;
2. I have read (or had explained to me) and understood the Study as explained in the attached information sheet;
3. I have had sufficient opportunity to ask questions and am prepared to participate in the Study;
4. I understand that my participation in the Study is entirely voluntary and that I am free to withdraw at any time without penalty (if applicable);
5. I voluntarily provide the UFS and the Researcher with my personal information and consent to the UFS and the Researcher collecting, disclosing and processing my personal information in order to conduct the Study and any related activities in relation thereto;
6. I hereby acknowledge and confirm that I understand the purpose for which the UFS and the Researcher may collect, store, use, delete, destroy, outsource, transfer or otherwise process, as the context and circumstances may require and as contemplated in terms of POPIA, my personal information as set out herein;
7. I am aware that the findings of the Study will be anonymously processed into a research report, journal publications and/or conference proceedings and that my personal information will be aggregated and deidentified at such stage;
8. I also give the UFS permission to share, without notification, the collected data with other researchers at the UFS or other Higher Education Institutions. This permission is dependent on the same principles of ethical research practices, anonymity/confidentiality, safekeeping of information, and other issues listed above applying.

I, the Participant, agree to the observed in class and also be audio recorded during interviews.

Full Name of Participant:

Signature of Participant: Date:

Full Name(s) of Researcher(s):

Signature of Researcher: _____ Date: _____

205 Nelson Mandela Drive, Park West, Bloemfontein 9301, South Africa
P.O. Box 339, Bloemfontein 9300, South Africa. T: +27(0)51 401 9111, www.ufs.ac.za

Appendix G: Lesson Plan Format

Conceptual Lesson Plan

DATE:		**DURATION:**	
CLASS/AGE:	5	**CLASS SIZE:**	10
Learning Outcomes:	1. LO 3: 2. LO 3: 3. LO 1: 4. LO 1:	**Concepts:**	1. 2. 3. 4.

MATERIALS:

METHODS:

OBJECTIVES: At the end of the lesson, children should be able to:

INTRODUCTION:

FIRST RING

LIFE SKILLS ACTIVITIES:

(Energising activities related to the learning area)

NUMERACY ACTIVITIES:

(Energising activities related to the learning area)

LITERACY ACTIVITIES (Sesotho**):**

(Energising activities related to the learning area)

LITERACY ACTIVITIES (English**):**

INDOOR/OUTDOOR ACTIVITIES:

Bear in Mind What to Prepare on Areas/Corners as per the theme

LEARNING CORNERS	**5 YEARS**
FANTASY/DRAMATIC CORNER	
LIBRARY CORNER	

SCIENCE/DISCOVERY CORNER	
BLOCK CORNER	
ART CORNER	
MATHEMATICAL CORNER	

SECOND RING

POEM/SONG:

_____

PSYCHOMOTOR

Warm up _____

Main Activity _____

Cool down _____

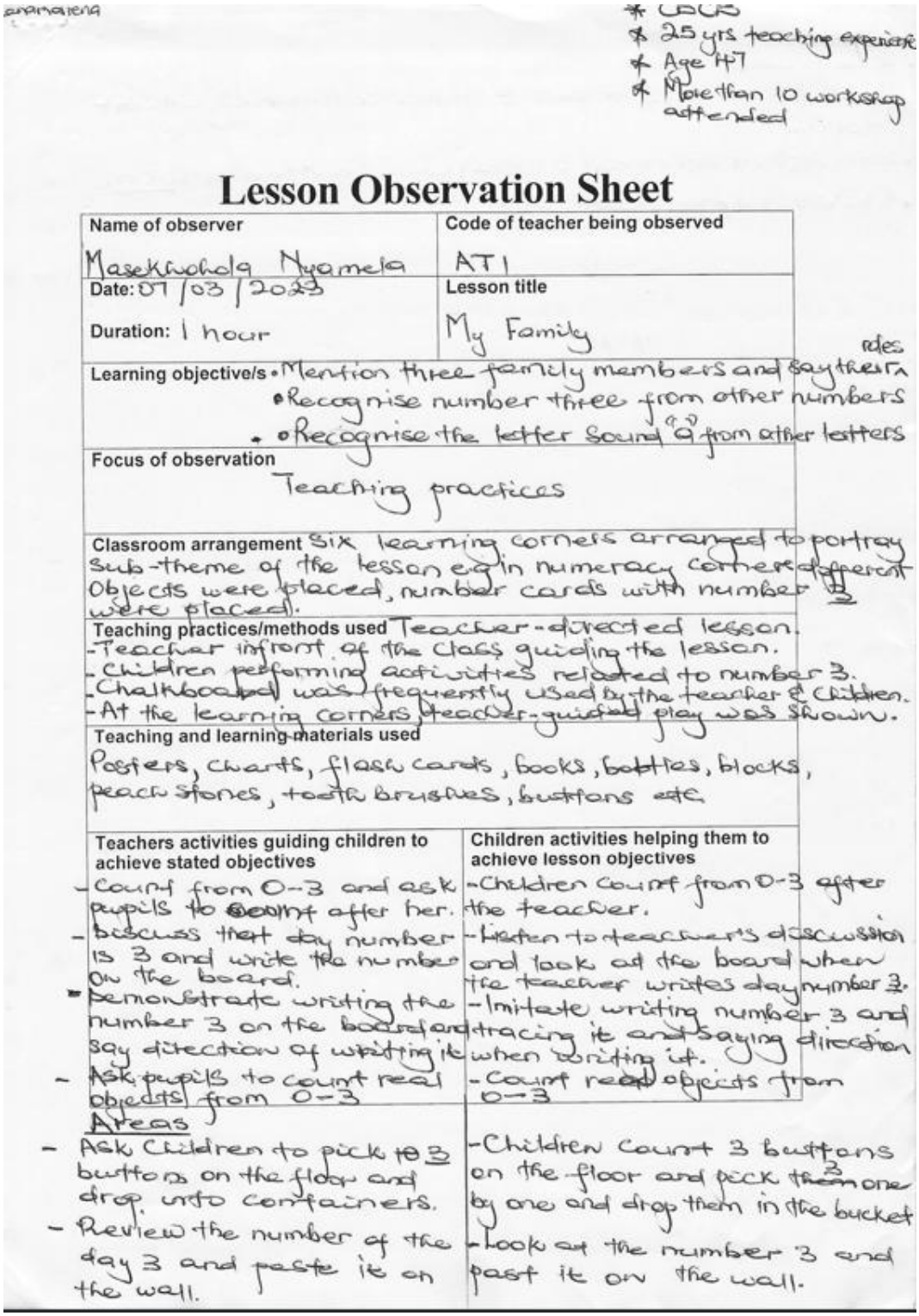
THIRD RING

STORY**: (**Tšomo ea *Litokotoko***)**

CONCLUSION:

EVALUATION:

Appendix H: Sample Observation Sheet Completed



* UBCS
* 25 yrs teaching experience
* Age 47
* More than 10 workshop attended

Lesson Observation Sheet

Name of observer	Code of teacher being observed
Masekwoholo Nyamela	AT1
Date: 07/03/2023	Lesson title
Duration: 1 hour	My Family

Learning objective/s
- Mention three family members and say their roles
- Recognise number three from other numbers
- Recognise the letter sound 'a' from other letters

Focus of observation
Teaching practices

Classroom arrangement Six learning corners arranged to portray sub-theme of the lesson e.g in numeracy corner different objects were placed, number cards with number 3 were placed.

Teaching practices/methods used Teacher-directed lesson.
- Teacher infront of the class guiding the lesson.
- Children performing activities related to number 3.
- Chalkboard was frequently used by the teacher & children.
- At the learning corners, teacher-guided play was shown.

Teaching and learning materials used
Posters, charts, flash cards, books, bottles, blocks, peach stones, tooth brushes, buttons etc.

Teachers activities guiding children to achieve stated objectives	Children activities helping them to achieve lesson objectives
- Count from 0-3 and ask pupils to count after her. - Discuss that day number is 3 and write the number on the board. - Demonstrate writing the number 3 on the board and say direction of writing it. - Ask pupils to count real objects from 0-3	- Children count from 0-3 after the teacher. - Listen to teacher's discussion and look at the board when the teacher writes day number 3. - Imitate writing number 3 and tracing it and saying direction when writing it. - Count real objects from 0-3
Areas - Ask Children to pick 3 buttons on the floor and drop into containers. - Review the number of the day 3 and paste it on the wall.	- Children count 3 buttons on the floor and pick them one by one and drop them in the bucket - Look at the number 3 and past it on the wall.

Outdoor activity

- A ball was used
- Children bounces a ball 3 times continiously without stopping.
- Successful 3 bounces (3 times) was counted a win
- Children take turns.

General comments on the focus of the observation

- This lesson was engaging children through play activities prepared by the teacher.
- Play was seen in learning corners.
- Outdoor activity was prepared and the teacher guided children.
- Lesson objectives were achieved.

Appendix I: Interview Guide For Reception Class Teachers

School code: _____ Teacher code: _____

1. How do children learn mathematics in your reception class?
2. Do you allow children to play when learning mathematics in your reception class?
3. If YES, which type/types of play do you allow: guided, free, direct instruction, games or all of them?
4. What are strength-based practices/approaches in your knowledge?
5. Which strength-based approaches are effective in facilitating playful mathematics learning in your reception class?
6. In your reception class, what strength-based teaching and learning approaches do you use to engage children in the playful learning of mathematics?
7. In the past three years, how would you describe children's performance in mathematics when using the strength-based approaches you mentioned in the previous question?
8. Besides the teacher's contribution, do you think the teaching and learning materials are enough to facilitate playful mathematics learning in your reception class?
9. Do you use ready-made or homemade/improvised teaching and learning materials or both to facilitate mathematical play pedagogy in your reception class?
10. If homemade/improvised, do you engage parents to develop your reception class's playful teaching and learning materials?

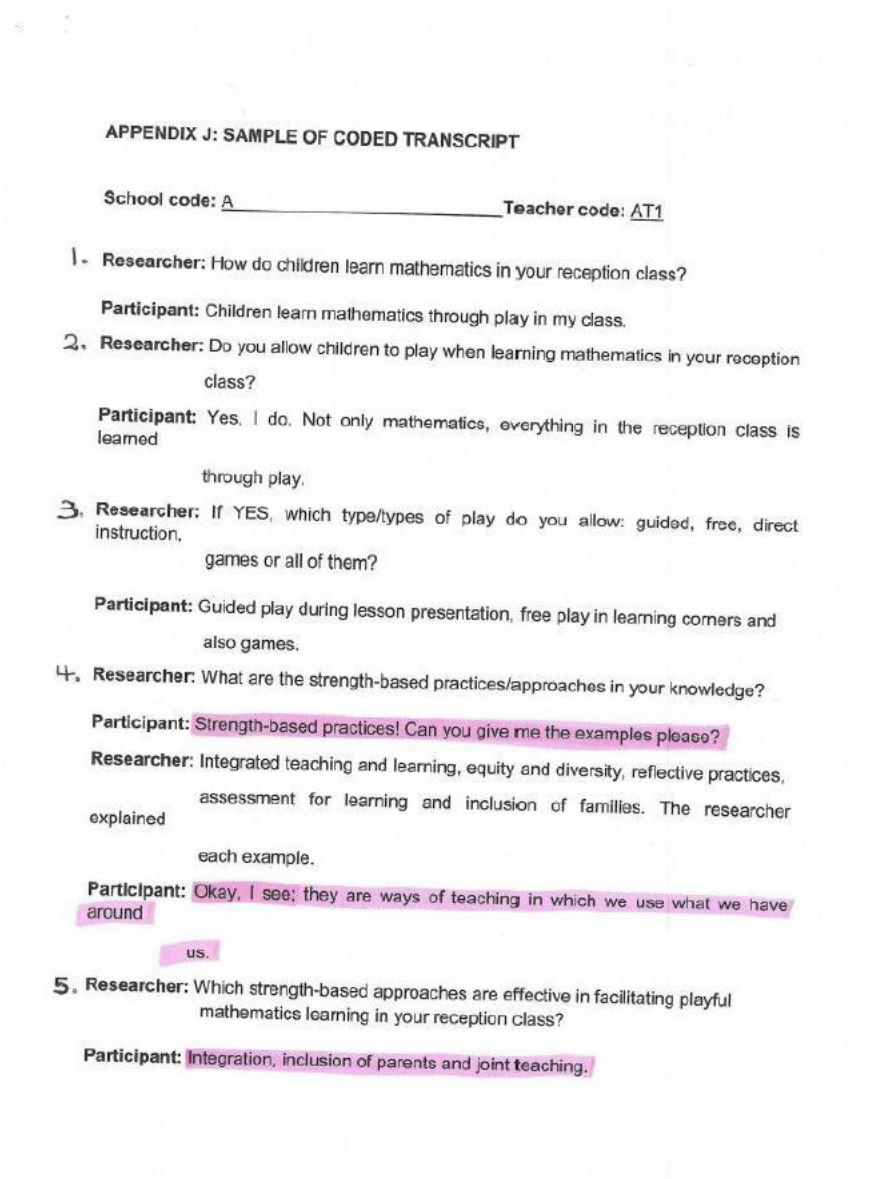
11. Do you think you are properly trained to teach mathematics through play using strength-based approaches in your reception class?

12. Do you think it is necessary to encourage reception class teachers to strengthen play pedagogy using strength-based approaches to teach mathematics?

13. If YES, why do you think it is necessary?

14. Do you have any suggestions for strengthening/improving play pedagogy to enhance mathematics learning using strength-based approaches in the reception classes?

Appendix J: Sample of Coded Transcript



APPENDIX J: SAMPLE OF CODED TRANSCRIPT

School code: A Teacher code: AT1

1. **Researcher:** How do children learn mathematics in your reception class?

Participant: Children learn mathematics through play in my class.

2. **Researcher:** Do you allow children to play when learning mathematics in your reception class?

Participant: Yes, I do. Not only mathematics, everything in the reception class is learned through play.

3. **Researcher:** If YES, which type/types of play do you allow: guided, free, direct instruction, games or all of them?

Participant: Guided play during lesson presentation, free play in learning corners and also games.

4. **Researcher:** What are the strength-based practices/approaches in your knowledge?

Participant: Strength-based practices! Can you give me the examples please?

Researcher: Integrated teaching and learning, equity and diversity, reflective practices, assessment for learning and inclusion of families. The researcher explained each example.

Participant: Okay, I see; they are ways of teaching in which we use what we have around us.

5. **Researcher:** Which strength-based approaches are effective in facilitating playful mathematics learning in your reception class?

Participant: Integration, inclusion of parents and joint teaching.

Researcher: What is joint teaching?

Participant: Joint teaching as a process of sitting together with other reception class teachers to help each other on how to address certain topics.

6. **Researcher:** In your reception class, what strength-based teaching and learning approaches do you use to engage children in the playful learning of mathematics?

Participant: Inclusion of parents and integrated teaching and learning approaches.

7. **Researcher:** In the past three years, how would you describe children's performance in mathematics when using the strength-based approaches you mentioned in the previous question?

Participant: Children performance is good in mathematics just like any other learning areas.

8. **Researcher:** Besides the teacher's contribution, do you think the teaching and learning materials are enough to facilitate playful mathematics learning in your reception class?

Participant: Yes, they are enough because we attend workshops in which we are trained on material production using what we have in our environments and the government is also giving us.

9. **Researcher:** Do you use ready-made or homemade/improvised teaching and learning materials or both to facilitate mathematical play pedagogy in your reception class?

Participant: Both home-made, ready-made and improvised.

10. **Researcher:** If home-made/improvised, do you engage parents to develop your reception class's playful teaching and learning materials?

Participant: Yes, each child has a math bag developed by a parent. *(She pointed a math bag hanged on the wall near numeracy corner).*

11. **Researcher:** Do you think you are properly trained to teach mathematics through play using strength-based approaches in your reception class?

Participant: Yes, we are trained to use integrated teaching and learning and also on how to engage parents to develop math materials.

12. **Researcher:** Do you think it is necessary to encourage reception class teachers to strengthen play pedagogy using strength-based approaches to teach mathematics?

Participant: Yes.

13. **Researcher:** If YES, why do you think it is necessary?

Participant: Because strength-based approaches help us to take care of children's talents and strength. They also help us to use what we have in our culture to develop teaching and learning materials e g we no longer use ready-made mats in our classrooms but use (makoko a linku) as mats.

14. **Researcher:** Do you have any suggestions for strengthening/improving play pedagogy to enhance mathematics learning using strength-based approaches in the receptions classes?

Participant: Because play pedagogy is fun, parents should be engage a lot to support with play materials, skills and resources where possible.

Researcher: Thank you very much for a fruitful interview we have this evening.

Participant: Thank you too.

Key Coding Colours:

- Teachers understanding of strength-based approaches.
- Existing strength-based approaches in ECCE Settings.
- Teaching and learning materials.
- Ways of strengthening strength-based approaches in ECCE Settings.

Appendix K: Turnitin Report

turnitin

Digital Receipt

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

The first page of your submissions is displayed below.

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File size:	16.68M
Page count:	256
Word count:	67,350
Character count:	402,729
Submission date:	18-Nov-2024 04:19PM (UTC+0200)
Submission ID:	2340738287

EXPLORING STRENGTH-BASED APPROACHES USING MATHEMATICAL PLAY PEDAGOGY IN LESOTHO EARLY CHILDHOOD CARE AND EDUCATION SETTINGS

BY

A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

EARLY CHILDHOOD DEVELOPMENT AND LEARNING

OF THE

UNIVERSITY OF THE FREE STATE

SOUTH CAMPUS, FREE STATE PROVINCE

2024

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Appendix L: Letter From Language Editor

Nikki Watkins
Editing/proofreading services
Cell: 072 060 2354 E-mail: nikki.watkins.pe@gmail.com

28 November 2024

To whom it may concern

This letter confirms that I have copy-edited and proofread the PhD thesis

"Exploring Strength-based Approaches using Mathematical Play Pedagogy in Lesotho Early Childhood Care and Education Settings

by

'Marorisang Mary Dongwane

UK Centre of Excellence Editing and Proofreading Diploma
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