

**IMPACTS OF THE COVID-19 PANDEMIC ON THE DEVELOPMENT OF COGNITIVE
AND MOTOR SKILLS OF GRADE R LEARNERS**

By

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MASTER OF EDUCATION



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in

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Bloemfontein, South Africa

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DECLARATION

I, Lerato Ramphele, declare that the contents of this thesis represent my own work and that the thesis has not previously been submitted for academic examination towards any qualification. All sources used or cited have been fully acknowledged and referenced. It is being submitted for the degree of Master of Early Childhood Development and Learning at the University of the Free State. It has not been submitted elsewhere in any format for a degree or examination at any other university.



Lerato Ramphele

23/02/2024

Date

DEDICATION

In the name of the Most Gracious and Most Merciful God,

I dedicate this thesis to:

My loving family,
for their unwavering support, encouragement,
and unwavering faith in my abilities.

My mentors and advisors,
for their wisdom, guidance, and patience
as I navigated the path of knowledge.

My friends and colleagues,
for their camaraderie, shared experiences,
and the strength they brought to my journey.

And to the Creator of all things,
for His boundless wisdom, grace, and inspiration
that illuminate the path of learning.

May God's blessings and guidance be upon this work, and may it serve as a testament
to His infinite wisdom and mercy.

Lerato Ramphele

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Lerato Ramphele

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ABSTRACT

The main aim of this study was to determine the impact of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners in the Motheo district of the Free State province, South Africa. To implement this research, four specific objectives, four research questions, and four null hypotheses, were formulated to guide the study. The study adopted an Ex-post-facto research design. The study used a quantitative research approach with a sample size of 160 respondents which comprised of 150 Grade R learners and 10 Grade R teachers. The instrument for data collection was a questionnaire developed by the researcher on cognitive and motor skill development. The instrument was validated by experts in measurement and evaluation, and early childhood education. The reliability of the instrument was ascertained using Cronbach's Alpha with coefficients of 0.82, 0.87, 0.79 and 0.88 for clusters A, B, C and D respectively. Mean and standard deviation were used to answer the research questions that guided the study, while an independent sample t-test was used to test the null hypotheses at 0.05 level of significance. The findings of the study showed that the cognitive and motor skills development of Grade R learners were above average. It was also found that the COVID-19 pandemic had a negative impact on the cognitive and motor skills development of Grade R learners. It was concluded that the COVID-19 pandemic had a negative impact on the cognitive and motor skills development of Grade R learners in the Motheo district. Based on the results of the study, it is recommended, among others, that efforts should be made by the school management, teachers, and parents, to promote activities that will enhance the cognitive and motor skills development of Grade R learners. This can be achieved by engaging the Grade R learners in activities that will promote and develop their cognitive and motor skills.

Keywords: COVID-19, cognitive skills, motor skills, Grade R learners, Grade R teachers

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LIST OF ACRONYMS AND ABBREVIATIONS

AA	Above average
ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
CNSPFS	Chinese National Student Physical Fitness Standard
COVID-19	Coronavirus
DATA	Individual pieces of information
ECCE	Early Childhood Care and Education
Grade R	Reception grade
MRI	Mullen Scales of Early Learning, and brain neuroimaging
MSEL	Mullen Scales of Early Learning
NS	Nova Scotia
SAA	Society for American Archaeology
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
SD	Secure Digital
SN	Scientific Name

CHAPTER 1

INTRODUCTION

The cultivation of cognitive and motor skills in learners ages 5 to 6 is imperative as these are the skills which lay the foundations for information processing, language acquisition, simple reasoning and problem solving (Sagar, 2019). Due to the COVID-19 pandemic, different challenges have been identified that have prohibited the full development of learners throughout the world. Thus far, researchers have highlighted the negative effect the COVID-19 pandemic had on the education system. According to Tadesse and Muluye (2020), the COVID-19 pandemic caused learners and teachers to be at a disadvantage in terms of access to technology, as a result, Teaching and Learning could not take place on an online platform. The COVID-19 pandemic affected the mental and physical health of learners. Many learners were obligated to become caregivers to their families. This role has caused learners to feel more anxious and feel more uncertain about the future (Tadesse and Muluye, 2020). Pillay (2021) states, that some learners could not attend school and if they managed to do so, they were too fatigued to focus. It is noteworthy that researchers who focus on education, have highlighted some important points. However, there is a lack of focus on how the cognitive and motor skills of Grade R learners have been affected and how this has caused a possible developmental delay. This study focused on Grade R learners and how they have been impacted by the COVID-19 pandemic and the identification of coping strategies were identified to aid them in achieving successful academic results.

1.1 Background to the study

When the COVID-19 pandemic led to the closure of schools, the entire nation was filled with uncertainty, especially the teachers. The researcher, along with fellow teachers, were uncertain how they would proceed with the curriculum and assisting the learners in gaining the requisite skills for the next grade. Currently, the 2021 learners are struggling with simple skills such as holding a pencil, sitting upright on a chair or being able to run without bumping into other learners. This has shown that the pandemic has created a gap in the cognitive and motor skills which, help with the simplest tasks and ensure a good founda-

tion for the learners to have academic success. Motor skills are crucial to the development and function of cognitive skills (Anderson, Campos, and Witherington, 2013). Cognitive skills help to perform various mental activities such as problem-solving, abstract thinking, reasoning, understanding complex ideas and the ability to learn from experience (Ispas and Bosman, 2015). These skills are concerned with the mechanisms of how one learns rather than the actual knowledge acquired (Du Plessis, 2018). Motor skill is a function that enables the muscle to act out a precise movement (Mauro, 2021). The different functions of the muscles in the human body can be categorized into two groups, namely, gross, and fine motor skills. Gross motor skills are made possible by the movement of large muscles, and these muscles help one to balance, coordinate, react on time and develop physical strength (Mauro, 20201). Fine motor skill is the movement of small muscles, for example, the muscles found in the hand (Mauro, 2021). Since many children in South Africa do not attend pre-school, they do not receive the benefits of developing the skills necessary to have a successful academic experience (Stadio, 2020). Teachers need to develop emergent reading, emergent writing, and emergent mathematics. It is important to note that, since children at this age learn through all their senses, a good foundation of cognitive skills will help them process and understand new information, and be able to solve problems and collaborate with others. Motor skills will ensure that they are able to engage through their five senses (Zander, 2019).

The development of cognitive and motor skills is important to the educational development of a child. Firstly, developing these skills will improve a child's comprehension (Goswami, 2007: 2). Comprehension helps children to explore, and it encourages them to take a hands-on approach to their learning. Secondly, it improves their language skills and their language proficiency (Goswami, 2007: 2). Thirdly, it helps develop their problem-solving skills by building on their previous knowledge and making connections to the new ones (Goswami, 2007: 2; Krevetzakis, 2019: 25). Fourthly, it optimizes their attention and alertness to the environment and what happens within it, and they are then able to adapt to the requirements of their environment (Legendre, 2005). Lastly, developing these skills has a positive influence on their motivation to complete tasks which contributes to mental and physical health (Legendre, 2005). Yet, emergent research has found that learners could not develop these skills due to the new learning barriers the education system was faced with during the outbreak of coronavirus (COVID-19).

According to the World Health Organization (2020) the coronavirus (COVID-19) is an infectious disease that is caused by a newly discovered coronavirus and was first discovered by doctors at the end of 2019. This disease is known to attack the respiratory system and can quickly spread from one person to another. The Mayo Clinic Staff (2021), stated that children of all ages are prone to become infected by this disease, but most of the children who are infected usually do not show any symptoms as adults do. Since the spread of COVID-19 many countries around the world implemented a state of emergency to stop the spread of the virus. The closure of schools due to COVID-19 pandemic affected the teaching and learning of millions of learners (Sebastian, 2020). Firstly, when the learners came back from the lock-down, they became more passive than active in their learning. The sudden shift of school being held traditionally to virtual mode and the amount of time they spent at home caused learners to lose interest in their work and they found it more difficult to participate in a virtual classroom environment (India Today, 2021). Secondly, the curriculum had to be adjusted. This meant that the learners missed a large amount of work that was important for their development. For example, according to Gustafsson (2020), children may experience special cognitive development difficulties. This is based on evidence that social and economic turmoil such as a pandemic can have lasting effects, especially on children. Thirdly, teachers were unprepared, and this affected the quality of instruction (Sarif, 2020). Lastly, many learners were unable to learn anything due to a lack of access to technology (Hobbs and Hawkins, 2020). The negative impact of the pandemic has not only affected the education system, but it has also created developmental barriers that has impacted the learners' holistic growth.

When it comes to child development, the holistic development approach emphasises the importance of teachers developing the physical, emotional, and cognitive well-being of children, particularly in early childhood (Mcilroy, 2021). Due to the reality of the pandemic and the new normal of lockdown, quarantine and social distancing has caused a negative impact on the holistic development of learners. Firstly, the paradigm shifts of traditional teaching presented to learners who were learning online, has caused feelings of being isolated, as learners were physically distanced from friends, and resultant loneliness (Gupta and Jawanda, 2020). Learners were bound to miss their peers and were deprived of their company for a length of time. This caused a drastic change in behaviour which led to the rise of mental health issues (Gupta and Jawanda, 2020). Social activity is important towards their development because it helps the learners to exchange experiences and learn

something new (Palmer, 2019). The absence of competitive sports in school, coupled with limited opportunities for learning to interact with others, has led to a visible decline in the skills needed to adapt to different and diverse environments.

(Anderson and Wilkins, 2021). Thirdly, good nutrition plays a crucial role in learners' cognitive development and academic performance (Roos, 2010). For example, vitamin D is mainly sourced from spending time in sunshine and due to learners being locked in their houses during lockdown their intake has been affected and due to this, it has led to the risk of respiratory tract infections and has made learners more vulnerable to COVID-19 and other diseases (Gupta and Jawanda, 2020). The negative impacts of nutritional deficiencies have been found in poor socioeconomic groups because they do not receive food donations from the feeding schemes at schools due to closure of schools as well as not being able to attend when the schools finally reopened (Gupta and Jawanda, 2020). Thirdly, the consequences of school closure and social distancing enabled only some of the children to engage in outdoor physical activities. Many did not have space to play outside due to the areas or circumstances that they lived in, such as apartments (Gupta and Jawanda, 2020). This has led learners to gain weight, caused a lack in basic motor skills such as balance and coordination. There has been an association made between regular physical activity and positive behaviours (World Health Organization, 2020). Lastly, due to facilities such as libraries being closed, or libraries are the only being accessed by learners who have access to technology and internet, has caused larger learning gaps between low and high socioeconomic groups (Gupta and Jawanda, 2020). The negative impact of the pandemic of the pandemic on the education system has been felt globally and in South Africa in particular.

Like other countries, the pandemic forced South African schools to close from March 18th (Mahlanga and Moloji, 2020). By early August 2020, depending on their grade, South African learners had lost between 30 and 59 days of school attendance. Learners had only attended half of the remaining school year due to the important requirement of social distancing (van der Berg, 2020). The teachers were not able to complete the curriculum which has caused many gaps in the education of the learners (van der Berg, 2020). With the shift to virtual learning, there has been a further great educational divide between socioeconomic groups (van der Berg, 2020). The differences that exist between the two socioeconomic groups have become apparent in terms of quality of education and access to resources which has determined the success or failure of a learner during this

pandemic (van der Berg, 2020). The shift to education being presented virtually has limited learners in South Africa leaving most of the learners lagging behind and trying to catch up (Jantjies, 2020). Other learners could not find a source of good nutrition as their only source of food was the feeding scheme program at school. When the lock-down and closure had ended further challenges presented themselves (Jantjies, 2020). Some learners had to return after becoming a caregiver because someone at home had passed on due to the disease and others could not come back due to comorbidities (Jantjies, 2020).

The impact that COVID-19 had on the Grade R learners has been the most difficult. At this age the learners are inquisitive and absorb knowledge like a sponge. According to D'Souza (2021) some parents had either chosen to delay the enrolment of their children, homeschool them, or had to take them out of school entirely due to the pandemic. According to Timmons, Cooper, Bozek and Braund (2021), there are four conditions under which children must learn. The first is a sense of belonging that involves connecting with others and building relationships. Second, is wellness by paying attention to learners' physical and mental health. Third, participation, including creating opportunities for learners to explore with their natural curiosity and finally, expression, focusing on providing learners with opportunities to communicate in various ways. Due to the pandemic these four conditions are not being met and caused some developmental gaps in their holistic growth. Circumstances such as social distancing and not being able to interact with their peers caused more barriers within the learning process. Despite attention to the early years of a child, there is not much research on how the cognitive and motor skills of Grade R learners have been influenced. By conducting this research, the education sector of South Africa may be provided with a better understanding of the impact of the COVID-19 pandemic on the cognitive and motor skills development of Grade R learners, and this will inform future strategies that could help learners develop these skills during and after a pandemic.

1.2 Problem statement

In 2021, a year after the COVID pandemic the full effects of its impact on the development of learners have become apparent. Grade 1 learners have had a difficult time adjusting to a new environment and requirements that need to be met. So far, they are unable to com-

plete simple tasks such as to cut and paste, to colour, sit upright in a chair or focus for long periods of time. These are skills that are commonly learnt in Grade R but due to COVID-19 these skills could not be developed in time for them to transition to a new grade. Research has mostly focused on how the COVID-19 pandemic has impacted the educational system. The majority of research has been focused on the impact of COVID-19 on learners and teachers when considering online teaching and learning, how poor socio-economic groups have been disadvantaged due to a lack of resources, and how COVID-19 has caused a rise in learners' mental health issues. These points that are highlighted are important, however there still needs to be research done to respond to the impact of COVID-19 on the development of cognitive and motor skills in Grade R to address the challenges that Grade R learners face which prevents them from academic growth and success.

1.3 Rationale for the study

Due to the COVID-19 pandemic Grade R learners have had to learn in an environment that does not promote the development required when considering skills such as balancing, writing, problem-solving, communication and processing information. In this study, I aim to investigate the impact of COVID-19 on the development of cognitive and motor skills of Grade R learners and provide strategies to help develop these skills.

1.4 Aim of the study

The aim of this study was to investigate the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners and provide strategies to develop these skills.

1.5 .1 Specific objectives

1.4.1.1 To determine the level of cognitive skill development of Grade R learners.

1.4.1.2 To determine the level of motor skill development of Grade R learners.

1.4.1.3 To determine the impact of COVID-19 pandemic on the cognitive skill development of Grade R learners.

1.4.1.4 To determine the impact of COVID-19 pandemic on the motor skill development of Grade R learners.

1.5 Main research question

What are the perceived impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners?

1.5.1 Sub-research questions

1.5.1.1 What is the level of cognitive skill development of Grade R learners?

1.5.1.2 What is the level of motor skill development of Grade R learners?

1.5.1.3 What is impact of COVID-19 pandemic on the cognitive skill development of Grade R learners?

1.5.1.4 What is impact of COVID-19 pandemic on the motor skill development of Grade R learners?

1.5.2 Hypotheses

1.5.2.1 There is no significant difference in the level of cognitive skill development of male and female Grade R learners.

1.5.2.2 There is no significant difference in the level of motor skill development of male and female Grade R learners.

1.5.2.3 There is no significant impact of COVID-19 pandemic on the cognitive skill development of male and female Grade R learners.

1.5.2.4 There is no significant impact of COVID-19 pandemic on the motor skill development of male and female Grade R learners.

1.6 Scope of the study

This study will be conducted in the Motheo district of Bloemfontein, Free State. The scope of this study was mainly on Grade R teachers who have been teaching before and during the COVID-19 pandemic as they were used to provide the measure of the impact of COVID-19 on motor and cognitive skills of Grade R learners, and the Grade R learners whose level of cognitive and motor development were measured. The research was conducted over three months with volunteers from three different schools. Due to it being quantitative research, a questionnaire was used to collect data.

1.7 Significance of the study

The findings of this study when published will be beneficial to the department of Education. As it will provide a better understanding of what is needed to ensure that documents such as the Annual Teaching Plan are not based on assumptions of what the learners need in Grade R but will provide guidelines that are focused on developing what the learners need and not try to catch up to the curriculum. Secondly, this will benefit teachers by providing them with strategies they could implement in their classes to enhance learning. Lastly, it will also be beneficial to Grade R learners as it will ensure that they acquire the cognitive and motor skills needed for their holistic development and transitioning to Grade 1.

1.8 Definition of operational concepts

Cognitive skills refer to the mechanisms of how we learn rather than the actual knowledge we acquire (du Plessis, 2018).

Motor skills is a function that enables the muscle to act out a precise movement (Mauro, 2021).

Coronavirus (COVID-19) is an infectious disease that is caused by a newly discovered coronavirus and was first discovered by doctors at the end of 2019 (World Health Organization, 2020).

1.9 PRELIMINARY LITERATURE REVIEW

1.9.1 Introduction

As of 2019, the world has been battling the COVID-19 virus and South Africa is no exception. With the rise of new infected cases and a series of lockdowns the current generation of South African learners have been trying to cope with a stressful event while coping with the loss of academic work. To help solve this problem the researcher will need to find the root cause to be able to close the developmental gaps that these learners are facing so that they may be able to have a successful academic journey. In this literature review the researcher will explore the concepts of (2.2.1) COVID-19, (2.2.2) Cognitive skills and (2.2.3) motor skills. In section 2.3, the researcher will review the theoretical framework that will aid and support this research. In section 2.4, the researcher will explore, (2.4.1) the effect of the level of cognitive skill development on learning outcomes, (2.4.2) the influence of the level of motor skill development on learning outcomes, (2.4.3) the impact of COVID-19 pandemic on the cognitive skill development of learners and lastly, (2.4.4) the impact of COVID-19 pandemic on the motor skill development of learners. And finally, the literature review will conclude with a summary in section 2.5.

1.9.2 Conceptual framework

1.9.2.1 The coronavirus (COVID-19) pandemic

According to the World Health Organization (2020), the coronavirus (COVID-19) is an infectious disease caused by a coronavirus, which was first discovered by doctors at the end of 2019. This disease is known to attack respiratory system and can spread at a fast pace. Mayo Clinic staff (2021) stated that children of all ages can become ill from the disease, however, most infected children usually do not show any symptoms or show the same symptoms as adults. In early March 2020, South Africa was hit by the COVID-19 pandemic and soon became the country most affected by the virus in Africa (Stiegler and Bouchard, 2020). Starting with a single case on March 5, the number of cases rose rapidly, forcing the South African government to respond quickly and place the country under a strict six-week lockdown. The South African government's strategy was successful in terms of curbing the spread of the virus. In June 2021, the growing number of cases in South Africa was part of a rampant recovery in Africa, and as 54 countries on the continent worked struggled to vaccinate a small part of their population, its peak was expected to exceed the previous wave (Magome, 2021).

1.9.2.2 Cognitive development of the learner

Cognitive skills can be defined as the mental procedure of obtaining information and comprehension through thought, experience, and sense (van der Fels, te Wierike, Hartman, Elferink-Gemser, Smith and Visscher, 2015: 698). There are different categories of cognitive skills such as executive functions, visual processing, short-term memory, long-term memory, fluid intelligence, and crystallized intelligence (van der Fels *et al.*, 2015: 698). Executive functions are advanced skills that enable willpower (van der Fels *et al.*, 2015: 698). These functions include metacognition skills such as response inhibition which is the suppression of actions that are not required or is inappropriate (van der Fels *et al.*, 2015: 698). Additionally, the skill of planning, which is the ability to set a goal and sub-goals and the ability to give each of their goals a set of actions to complete or achieve it. Another skill is that of attention, which is the ability to remain focused while there is distraction within the environment. Lastly, the skill of building a working memory which means that an individual can store and manipulate information over a certain period.

The second characteristic of cognitive skills is visual processing. This entails the path that visual stimulus is taken from the visual sensors to the brain (van der Fels *et al.*, 2015: 698). Another cognitive skill is that of short-term memory which comprises of the capacity to store information in the mind for a short period of time (van der Fels *et al.*, 2015: 698). Additionally, long-term memory is the capacity to retain information for a long period of time (van der Fels *et al.*, 2015: 698). Fluid intelligence is another necessary component as it is the capability to solve problems and think rationally in different situations (van der Fels *et al.*, 2015: 698). Lastly, crystallized intelligence refers to the capability to access information from the long-term memory storage and use the skills, knowledge, and experience in the appropriate situation (van der Fels *et al.*, 2015: 698).

1.9.2.3 Motor skills development

Motor skills can be defined as a sequence of movement that has been learned and is combined to produce an efficient and smooth action to do a particular task (van der Fels *et al.*, 2015: 697). According to van der Fels *et al.* (2015: 297), the human body produces many different types of movement that can be categorised and distinguished into various groups such as, gross motor skills and fine motor skills. Gross motor skills are the movement of the large muscles of the limbs, for example, those used in running, skipping, and jumping (van der Fels *et al.*, 2015: 697). These muscles have a capacity for strength, agility, flexibility, and the balance necessary for activities to be accomplished. Additionally, fine

motor skills include the movement of small muscles such as those used in the hand and eye during activities such as writing and reading. To accomplish these tasks precision and integration abilities are necessary (van der Fels *et al.*, 2015: 697). The category of bilateral body coordination is also important, this can be defined as the ability of an individual to use both sides of the body to complete a task (Karambe, Dhote and Palekar, 2017). Timed performance movement is also a relevant category as this is the ability for an individual to complete a required number of movements within a particular time frame. Normally when movement is timed it is divided into two categories. The first is repetitive movement which is movement that is simple and can be done as quickly as possible and secondly, sequenced movement, which includes movements that can be alternated and are more difficult and can also be done quickly (van der Fels *et al.*, 2015: 698). The second category is that of object control, which is the ability to control an object such as a ball (van der Fels *et al.*, 2015: 698).

1.9.3 Theoretical framework – Cognitive Development Theory

Jean Piaget's theory of cognitive development suggests that intelligence will change as children grow older. Children's cognitive development is not just about acquiring knowledge, children must also develop or build a mental model of the world (Piaget, 1976). Cognitive development occurs through the interaction of innate abilities and environmental events, and children go through a series of stages. The Piaget stages are: (a) sensorimotor stage: from birth to 1824 months, (b) preoperational stage: from 2 to 7 years, (c) specific operation stage: from 7 to 11 years; (d) formal operation stage: 12 years and over. He believes that there are differences between the thinking of adults and children. Piaget proposed a new set of hypotheses about children's intelligence. First, the reasoning (thinking) of children is different from that of adults, and their way of seeing the world is different. Second, children actively develop their knowledge of the world. They are not passive creatures waiting for someone to fill their heads with knowledge. Finally, the best way to understand children's reasoning is to look at the problem from their point of view.

For this study, the researcher will be focusing on the preoperational stage. The preoperational stage is believed to be when children begin to think symbolically and learn to use words and pictures to represent objects. The children in this age group are improving their language and thinking, and they still tend to think about things in a concrete manner (Cherry, 2020). Due to the pandemic, language and thinking skills are the most impacted

because learners did not have a conducive environment that stimulated and guided them. Piaget (1976), believes that children play an active role in the learning process. They behave like little scientists in conducting experiments, observing, and understanding the world. When children interact with the world around them, they will continue to add new knowledge, build on existing knowledge, and adjust old ideas to accumulate new information. Cognitive and motor skills will aid in developing important skills that would aid learners to achieve language and thinking skills as children at this age learn best by actively being involved, engaging with the environment, and attempting new activities (Pyle, Prioletta and Poliszczuk, 2018). This theory will allow the study to mainly focus on cognitive and motor skills, to understand these concepts individually and how these concepts can be used to create strategies that will aid in helping bridge the gap post COVID-19.

1.9.4 Review of related empirical studies

In this section, the researcher will discuss different findings from researchers regarding the (2.4.1) effect of the level of cognitive skill development on learning outcomes, (2.4.2) influence of the level of motor skill on learning outcomes, (2.4.3) impact of COVID-19 pandemic on the cognitive skill development of learners and (2.4.4) impact of COVID-19 pandemic on motor skill development of learners.

1.9.4.1 Effect of the level of cognitive skill development on learning outcomes

Cognitive skills promote positive, constructive, and lasting knowledge (Pyle, Prioletta and Poliszczuk, 2018). These skills enable learners to participate in the learning process and teaches them to use their mind more effectively to make connections when they acquire new information. First, cognitive skills encourage learners to adopt practical learning methods. This allows them to explore their environment and develop a deeper understanding. Second, these skills teach learners the skills necessary to learn effectively. This helps learners develop transferable learning and problem-solving skills that can be applied to any subject. Third, the development of these skills enables learners to build on previous knowledge and ideas. This teaches learners to make connections and apply new concepts to what they already know. Finally, through a deeper understanding of the subject and stronger learning skills, learners can handle school assignments with enthusiasm and confidence. Giving learners the opportunity to actively participate in learning will make learning fun and exciting. This helps learners develop a lifelong love of learning.

1.9.4.2 Influence of the level of motor skill development on learning outcomes

According to Connell and McCarthy (2013: 9), the brain prioritizes movement, and that movement is so important that it becomes one of the most important functions of the brain, meaning that if a child is to develop any type of skill it needs to be accomplished through movement. This means that, if a child from between the ages of five to six years old needs to develop the cognitive skills they need for the following grade, they need to achieve this through developing their motor skills. There is an interplay between developing the muscles and the brain, as the human brain is activated during physical activity (Krevetakis, 2019: 25). Therefore, motor skills are important for learners' short and long-term memory which also helps the learners achieve academic success. Motor skills increases their attention span and their ability to retain information longer. This may lead to the decrease of behavioural problems, such as fights, because their levels of energy are being regulated. In addition, it helps learners to optimize their attention and encourages alertness, this helps them understand abstract concepts by making them tangible, motivating and improving mental health. According to Thayer (2020), motor skills help children gain strength and confidence in their body. This promotes a healthy lifestyle by giving them the opportunity to exercise, this in turn helps children to develop complex skills that will later help them to work in a team or group.

1.9.4.3 Impact of COVID-19 pandemic on the cognitive skill development of learners

During this pandemic, students experienced both direct and indirect factors that affected their cognitive development. First, when students returned from confinement, they were more passive than active in learning. With the sudden shift from traditional schools to virtual models and the long periods of time spent at home, students lost interest in their work and found it more difficult to participate in virtual presentations (Andrew, Wallace and Sambell, 2021). Secondly, the curriculum needed to be adjusted. This means that students lost a lot of work that was important to their development, which in turn caused them to miss various activities that can develop certain cognitive skills. According to Gustafsson (2020), this caused students to experience cognitive difficulties. Third, teachers were poorly prepared, which affects the quality of teaching, which in turn affected the way students' approach and understand new topics (Sarif, 2020). Finally, many students did not learn anything because they could not use technology (Hobbs and Hawkins, 2020). This

means that some students have completely lost the cognitive skills of attention and have now fallen behind.

1.9.4.4 Impact of COVID-19 pandemic on the motor skill development of learners

During the pandemic, within the initial COVID-19 virus outbreak timeframe, children were less active, played less outdoors, were sedentary, engaged in more screen-based entertainment, and slept longer (Moore, Faulkner, Rhodes, Brussoni, ChulakBozzer, Furgason, Mitra, O`Reilly, Spence, Vanderloo and Tremblay, 2020). Firstly, because learners spent more time in front of the screen and as a result, they experienced back pain, strained their eyesight, had sleep disturbances, which in turn had affected their physical development (Anderson and Wilkins, 2021). Secondly, the nutritional health of the learners deteriorated. The negative effects of nutritional deficiencies have been seen in poor socioeconomic groups. They were unable to obtain food from the school's meal plan due to school closures and were unable to attend classes every day when the school finally reopened (Gupta and Jawanda, 2020). Thirdly, one of the other consequences of schools closing and social distancing was that some children could not engage in outdoor sports activities, while others had no space to play outdoors because they live in apartments (Gupta and Jawanda, 2020). This caused learners to gain weight and miss out on the development of basic motor skills such as balance and coordination.

1.9.5 Summary of preliminary literature review

To conclude, this literature review has investigated the three main concepts which are COVID-19, and cognitive and motor skills. In addition, the research focused on cognitive development theory. This theory is suitable because it allows the use of both cognitive and motor skills to reach an end goal. The theory also works simultaneously with the statement that children learn through play. This means that if cognitive skills need to be developed motor skills need to in tandem. The review also discussed the effects that cognitive skills and motor skills have on learning outcomes. Lastly, the researcher discussed how the pandemic has impacted the development of these skills. If these skills are not developed from the age of five, then the future of this nation will not have the basic skill to change our community for the better.

1.10 RESEARCH METHODOLOGY

1.10.1 Introduction

The purpose of this research was to understand the impacts of COVID-19 on the development of cognitive and motor skills of Grade R learners in Bloemfontein. In this chapter the researcher, firstly, described the research paradigm, research approach, as well as the research design for the study. Secondly, the researcher described the study area, population, sample size and sampling procedures and the instruments that was used to collect data. Thirdly, the researcher described how the document was qualified by measures of instruments' validity and reliability and piloting. Finally, the researcher discussed the collection and analysis of the data collection methods and the ethical considerations in order to maintain the integrity of the research.

1.10.2 Research paradigm

A research paradigm is the method by which people develop a worldview based on the direction of their topic and the research community, consultants and mentors, and past research experience (Creswell and Creswell, 2018). The worldview is considered a general philosophical orientation about the world and the nature of the research carried out by researchers. The type of beliefs held by individual researchers based on these factors often lead to the use of strong qualitative, quantitative, or mixed methods in their research. The researcher made use of the paradigm within post-positivism.

Post-positivism or positivism hypotheses represent traditional research forms, and these hypotheses are more effective for quantitative research as opposed to qualitative research (Creswell and Creswell, 2018). Positivism challenges the traditional concept of the absolute truth of knowledge and admits that when we study human behaviour and actions, we cannot be certain of our knowledge. Research involves making and testing claims, including identifying and testing causality, such as A vs B or B vs A, under certain conditions (Leavy, 2017). The questions studied by post-positivists reflect the need to identify and evaluate the reasons that influence the results, such as those found in experiments. In a sense, it is also reductionist. The purpose is to reduce ideas to a small, discrete set for testing, such as variables containing hypotheses and research questions. The development of observed numerical measurements and the study of individual behaviour are cru-

cial for post-positivists (Creswell and Creswell, 2018). Finally, in the scientific method, the research method accepted by post-positivists, researchers start with a theory, collect data to support or refute the theory, and then make the necessary modifications and perform additional tests.

1.10.3 Research approach

This study has adopted the quantitative research approach. Quantitative studies are characterized by a promotional approach to research processes aimed at proven, short or fuse reliability for existing theory (Leavy, 2017). This type of research includes measurements of variables and test relationships between the variables to clarify patterns, correlations, or causality. Researchers can adopt a linear method of data collection and analysis resulting in statistical data. The underlying value of quantitative research includes neutral, objectivity and quite acquisition of knowledge. This approach is generally appropriate when it explains or evaluates its main purpose. Collecting quantitative information enables researchers to perform simple and extremely complex statistical analyses, aggregate data, show relationships between data, and compare aggregated data. Quantitative research includes methods such as questionnaires, structured observations, or experiments.

1.10.4 Design of the study

Research design refers to the overall strategy chosen to integrate different research components in a coherent and logical way to ensure that you will effectively solve the research problem; form a plan for data collection, measurement, and analysis (Creswell and Guetterman, 2019). The main quantitative design is experimental research and survey research (Leavy, 2017) For the purpose of this study, an Ex-post facto research design was adopted. An ex-post facto research enables a researcher to explore the impact or influence of independent variables on the dependent variable without the manipulation of the independent variables. Thus, this design was appropriate in studying the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners.

1.10.5 Study site

The site used for this study was the Motheo district in Bloemfontein. The Motheo district is made up of different schools of different genders, socio-economic backgrounds, cultures,

ethnicities, languages, and races. The resources are different. While some schools have advanced technology, equipment, and classroom space, others lack it. The research site applies to two schools, not just one, as these schools reflect the population of 747,431 in Bloemfontein.

1.10.6 Population, sample size and sampling procedures

The site for this study was Motheo district in Bloemfontein. For this study purposive sampling was used. A purposive sample is a non-probability sample selected according to the general characteristics and objectives of the investigation (Crossman, 2020). This sampling allowed this study to focus on two schools with two Grade R classes. The sample for this study comprised all the Grade R learners and their teachers in two schools. This sampling was not randomised as the study requires both Grade R learners and educators. Both teachers and learners can be studied in quantitative research. In this study, teachers' perceptions on the impact of COVID-19 on cognitive and motor skills was sought by asking the teachers to fill out a questionnaire on the issue.

1.10.7 Instruments for data collection

Three instruments namely a questionnaire, a Cognitive skill development Test and a Motor skill development scale were used for data collection. The questionnaire had three sections consisting of A, B and C. Section A, contained information on the demographics of the Grade R learners such as gender, Race, language of teaching and learning and how many years the teacher has been teaching the grade how many they are in class. Section B, contained information on the impact of COVID-19 on Grade R learners' cognitive skill development, while section C, contained information on the impact of COVID-19 on Grade R learners' motor skill development. The second instrument was a Cognitive skill development Test while the third instrument was a Motor skill development scale. Collecting data means identifying and selecting people for research, obtaining their research permission, and collecting information by asking people questions or observing their behaviour (Creswell and Guetterman, 2019). It focuses on finding all the content on a specific topic. For the purposes of this research, surveys were used. Survey data is defined as outcome data collected from a sample of respondents who participate in the survey (Levy, 2017). This data is comprehensive information on a specific topic collected from the target audience for research purposes.

1.10.8 Measures of instruments' validity and reliability and piloting

The instruments for this study were face validated by test development experts and early childhood educators. After the face validation of the instruments, they were pilot tested on an appropriate sample which was not part of the study to determine the internal consistency and reliability of the items of the instruments. Reliability and validity are concepts used to assess the quality of research (Creswell and Guetterman, 2019). Validity is the degree to which results measure that which should be measured (Creswell and Guetterman, 2019). They indicate the degree to which a method, technique, or test measure something. Reliability is related to the consistency of the measurement, and validity is related to the accuracy of the measurement. Reliability refers to the degree to which the results can be reproduced when the survey is repeated under the same conditions. Pilot testing involves conducting surveys before actual research to verify the feasibility and effectiveness of selected methods and technologies in the same field but in a smaller sample (Creswell and Guetterman, 2019).

1.10.9 Data collection procedures

Data collection is the procedure of collecting and measuring information based on the criteria or variables of interest that will answer the stated research question (Bhat, 2019). The importance of data collection is so that the research has integrity, to reduce errors, to minimize the risk of errors in the decision-making process, to save cost and time and finally, to support the need of a new idea, change or innovation (Creswell and Guetterman, 2019). The impact of COVID-19 was measured by collecting two sets of data on the cognitive skill development of the Grade R learners. The first set was their cognitive skill development scores (achievement scores) prior to the emergence of COVID-19 while the second set was their cognitive skill development scores during the COVID-19 to be obtained during field work. Thereafter, the scores prior and during COVID-19 were compared to ascertain the impact of COVID-19. If their cognitive skill development score declined during COVID-19 than prior to COVID-19, one can conclude that COVID-19 had negative impact on their cognitive skill development.

1.10.10 Data analysis procedures

Data analysis is the process of verifying, cleaning, transforming, and modelling data (Leavy, 2017). Quantitative data analysis involves many steps. Firstly, a report was provided

on the number of sample participants who returned and did not return to the survey. Secondly, the method used to determine the bias of the response. Thirdly, it provided a descriptive analysis plan for the data collected for all independent and dependent variables in the study. Thus, the data to be collected for this study was analysed using percentage, mean, standard deviation, and t-test of independent samples. While percentage and mean were used to analyse the data to answer the research questions, t-test of independent samples was used to test the hypotheses.

1.11 Ethical considerations

In quantitative research, one must pay close attention to addressing ethical and legal norms and rules (Creswell and Guetterman, 2019). Research ethics can not only encourage researchers to improve the level of ethical literacy in the research community, but more importantly, reflect on their research projects and processes from the perspective of all potential stakeholders. Therefore, if ethical and legal standards are observed, the rights and interests of everyone involved in the research are protected.

1.11.1 Gaining entry.

The research permission letter is written in relation to a request for a research project in a certain area of interest (Clark-Kazak, 2017). This letter allows one to continue their research project after seeing the benefits of research from a broad perspective. The competent authority of the relevant department issues such a letter to allow the organization or company to further advance its proposal. The letter also discussed the details of the research plan to assist the company. This letter was first be sent to the department of education within the Motheo district. After approval, the letter was sent to the principal of the school selected.

1.11.2 Participants' right

Participants have the right to be informed of what is required of them to participate in research and be informed of the purpose of the investigation. They should be informed of what would happen during the study; what they were asked to do; the duration; know that part of the research is experimental; learn about all the possible risks, side effects, and discomforts that they might encounter. If the participant decides not to participate, they should be informed of other available options, understand how personal information will be

kept confidential; withdraw from research or refuse to participate at any time without being punished for loss of profit; discussion on informed consent will be provided. This means that researchers should explain the entire study and then provide time to make the right decision for themselves without any pressure. Participants will receive a copy of their consent and information on who to contact if they have any questions.

1.11.3 Informed consent

Informed consent is the basic guarantee of research. The obligation to obtain informed consent derives from respect for those who decide to voluntarily participate in research. For these reasons, no one can be used as an object of research against their will. Thus, participants were given voluntary informed consent before including potential participants in this research protocol. Effective informed consent requires that people can consent and that they have sufficient knowledge of the subject matter to decide. Individual consent must also be voluntary.

1.11.4 Confidentiality

Confidentiality refers to the condition that the researcher knows the identity of the research object but takes measures to protect the identity from being discovered by others (Davis, 2021). In a research environment, confidentiality means not discussing information provided by individuals with others and presenting results in a way that ensures that individuals cannot be identified. In this research, the confidentiality of the participants was ensured by using pseudonym or fake names to represent the identities of the participants.

1.11.5 Protection from harm

Protection from harm is an ethical and legal commitment to support, respect, and value the dignity and value of participants. Violation of confidentiality regulations is a potential risk of participating in research. To protect the confidentiality of participants, the data in the computer files should be encrypted as soon as possible, the signed consent and other documents should be stored in a locked file cabinet, and the personal identifier should be deleted from the research file as soon as possible.

1.11.6 Achieving anonymity.

Anonymity means that no one participating in the research can access the information and identities of the participants. In other words, even researchers cannot know the identity of the participants. Therefore, in this type of research, the researcher cannot collect personally identifiable information from the participants.

1.11.7 Maintaining professionalism.

Being a professional is about having strong skills and competence in your chosen field. There is a certain obvious expectation that you would have the experience and qualification to deliver your product or service. Professionalism is also about the qualities and behaviours you exhibit, and the way you conduct yourself during your research. As a professional, the researcher will be counted on to find a way to get the job done. Responding to people promptly and following through on promises in a timely manner is also important, as this demonstrates reliability. Professionals are experts in the field they are researching. Professionals adhere to a strict code of ethics. During written or email correspondence, letters and emails need to be brief and to the point. The tone should be polite and formal without being cold. Professionals are always accountable for their actions.

1.11.8 Participants' vulnerability

The researcher is aware that every research activity carries the possibility of vulnerability. The researcher will be looking out for any such possibilities. As the study will involve both the learners and their teachers, it is possible that some teachers may feel that they have let down their learners if the fieldwork exposes the possibility of how they might have let the learners down without realising their failures except for the fieldwork encounter with the researcher. That is why (1.11.4) on confidentiality is a very important aspect of the study. The researcher took the responsibility to counsel the participants during the fieldwork such that they were assured how they were protected in the study. However, if in any unlikely event of serious psychological challenges because of participating in the fieldwork, such affected participants would have been referred to receive professional psychological counselling.

1.12 Chapter summary

In summary, the researcher first discussed the paradigm, the research method, and the research designs that were implemented. Second, the researcher described the research location, population, sample size, and sampling procedures and tools that were used to collect data. Third, the researcher described how to make the research high-quality research by measuring the effectiveness and reliability of tools and pilots. Fourth, description of how data was collected and analysed, and finally, ethical consideration information was outlined and discussed.

1.13 Organization of chapters

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Research Methodology

Chapter 4: Data Analysis and Interpretation

Chapter 5: Discussions, Conclusions and Recommendations

List of References

Appendices

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This literature review combines a conceptual framework, a theoretical framework, a review of related empirical studies, and a summary of the literature to comprehensively examine the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners. By analysing existing research, this review aims to contribute to the understanding of the challenges faced by Grade R learners and provide recommendations for addressing the potential long-term consequences of the pandemic on their skill development. The conceptual framework of this literature review examines the theoretical underpinnings of cognitive and motor skill development in Grade R learners and explores the ways in which the COVID-19 pandemic has influenced these developmental processes. By analysing the existing literature, this review aims to identify the key factors that contribute to the development of cognitive and motor skills, as well as the specific challenges posed by the pandemic.

The theoretical framework employed in this literature review draws on a theory of early childhood development. This framework provides a theoretical lens through which to understand the cognitive and motor skill development of Grade R learners and to examine how the pandemic has disrupted or altered these processes. By integrating this theoretical perspective, this review seeks to provide a comprehensive understanding of the impacts of the pandemic on cognitive and motor skill development.

The review of related empirical studies offers a comprehensive analysis of existing research on the impacts of the COVID-19 pandemic on the cognitive and motor skill development of Grade R learners. This includes studies that have investigated the effects of remote learning on cognitive and motor skill acquisition, the influence of reduced physical activities on motor skill development, and the role of socio-economic factors in shaping skill outcomes. By critically examining these empirical studies, this review aims to identify the key findings, methodological approaches, and gaps in the current research literature.

Finally, the summary of the literature review consolidates the findings from the conceptual framework, theoretical framework, and review of empirical studies. It provides a synthesis of the current knowledge on the impacts of the COVID-19 pandemic on the development of cognitive and motor skills among Grade R learners. By summarizing the key findings

and implications of the literature, this review seeks to inform educational policies, curriculum adaptations, and intervention programs that can address the unique challenges faced by Grade R learners in the wake of the pandemic.

2.2 Conceptual framework

2.2.1 The coronavirus (COVID-19) pandemic

Millions of people's lives have been adversely touched by the outbreak of various infectious diseases (Khan, Adil, Alkhatlan, Tahir, Saif, Khan, and Khan, 2020). Not only have these illnesses put a strain on healthcare and public health infrastructure, but it has placed a burden on economists, scientists, and politicians as they respond to the financial difficulties, discover vaccines, and deal with public expectations and anxieties, respectively (Khan *et al.*, 2020).

The end of 2019 saw the occurrence of one such infectious disease. According to Sauer (2022), there are numerous varieties, and some of them are disease-causing. A respiratory ailment pandemic known as COVID-19 was brought on by the coronavirus SARS-CoV-2, which was discovered in 2019. The then-new coronavirus later known as SARS-CoV-2 was the cause of the first case of COVID-19, which was reported on December 1, 2019. SARS-CoV-2 may have originated from an animal source to be able to infect people (Sauer, 2022). Viruses that originated in birds, pigs, bats, and other animals and transformed to become deadly to people, have been linked to several infectious disease epidemics in the past. Further investigation could possibly shed light on the processes by which the coronavirus changed through time to become a pandemic illness.

The coronavirus is now understood to spread through airborne droplets and virus particles that are released when an infected person breathes, talks, laughs, sings, coughs, or sneezes. Little infectious particles can persist in the air and build up indoors, especially in crowded areas with inadequate ventilation, where larger drops may fall to the ground in a matter of seconds. This is why protecting against COVID-19 requires the use of masks, good hand cleanliness, and physical separation.

Within two to 14 days of being exposed to the virus, people begin to exhibit symptoms. Depending on their immune system and the severity of their sickness, a person with the coronavirus is contagious to others for up to two days before symptoms show up and for more or less 10 to 20 days after that. While some coronavirus-infected individuals experience moderate COVID-19 sickness, others show no symptoms at all. However, COVID-19

has the potential to cause death, kidney failure, permanent lung and heart muscle damage, nervous system issues, and respiratory failure in some people. The severity of the infection will determine how COVID-19 is treated (Sauer, 2022). Resting at home and taking medication to lower the fever usually suffices for lesser illnesses. Hospitalization may be necessary for more severe cases, and treatment may entail injectable drugs, additional oxygen, assisted ventilation, and other supportive measures.

2.2.2 Cognitive development of the learner

Children's early years are their most formative years, thus involvement in activities should be encouraged during these two to three years. A child learns to use their body and senses as a tool for learning during this particular time. A child is born with the biological intelligence tissues, but these don't help the child until they move around and act, investigate and manipulate their surroundings, see, and describe it, and apply it. The term for this is cognitive function (Cherry, 2021).

The mental activities of obtaining and processing information to carry out a task are referred to as cognitive functions (Madeleine, 2021). It enables one to consider new information and make choices based on knowledge they have already gathered (Jasper, 2020). Simply, it refers to everything that takes place in your brain during a task. A simple example is walking. It requires the same mental activity and information processing as calculating a math equation. Cognition relies on its prior experiences to function and is influenced by several things, such as, understanding, self-awareness, learning, emotional knowledge and recognition, planning, reasoning, problem-solving, and creativity are a few of these factors (Jasper, 2020).

Several cognitive skills are used within the cognitive function process. The brain uses cognitive skills to think, learn, remember, reason, and pay attention. These cognitive skills are crucial for completing both large and challenging tasks as well as smaller and simpler ones like reading. The primary cognitive abilities are attention, language, learning, memory, perception, and thought (Cherry, 2022).

The ability to select and concentrate on pertinent inputs is known as attention (Cherry, 2022). It is a mechanism for choosing between external inputs like sound, smell, emotion, etc. as well as internal influences like one's thinking. While being able to pay attention one should be able to block out extraneous inputs while carrying out routine duties. The ability to comprehend and communicate ideas through spoken and written words is a component

of language and language development. This makes it possible for us to communicate with others and is crucial for thought. Learning necessitates cognitive processes such as information synthesis, integration with past knowledge, and assimilation of new information. Each cognitive activity involves memory. It is an essential part of learning and enables people to retain information about the outside world and their own pasts. This knowledge can be stored in your memory for anywhere between a few seconds and a lifetime. The act of capturing, analysing, and making sense of the stimuli that are received by your senses is known as perception. This encompasses the senses of sight, sound, touch, smell, and taste. People can use information they get through their senses to respond to situations and interact with others (Cherry, 2022). Every cognitive process depends on thought. It enables people to exercise greater reasoning, problem-solving, and decision-making.

According to the Centre for Disease Control and Prevention (2019) children have a variety of talents to learn over a long period of time and are born ready to learn. Children look to parents, relatives, and other caretakers as their first teachers to acquire the necessary abilities to become independent and enjoy happy, healthy lives. The experiences a child has with other people and the outside environment, have a significant impact on how their brain develops. The growth of the brain depends on the growth and development of the brain are dependent on a positive and nurturing mental environment. Children learn and develop most effectively in a secure setting with lots of play and exploration opportunities.

2.2.3 Motor skills development

Our daily motions and duties are made possible by our motor skills. These abilities must be acquired for children to develop (Mauro, 2022). Children's motion for playing, feeding themselves, and getting about are made possible by their motor abilities. Although milestones are typically reached at specified ages for the development of key motor skills in children, this is not always the case. There are two types of motor development in children: fine motor and gross motor.

Fine motor skills engage the use of smaller muscles such as those found in hands and fingers, to handle and control small things (Strooband, de Rosanay, Okely and Veldman, 2020). Activities requiring fine motor skills call for manual dexterity as well as the ability to coordinate eye and hand movements, or hand-eye coordination (Mauro, 2022). The development of fine motor skills includes the manipulation of manual activities including writ-

ing, weaving ropes, arranging beams, tying shoelaces, turning pages of books, using scissors, playing with playdough, and folding paper into shapes (Syafri, Susanti, El Fiah, Rahayu, Yaumas and Ishak, 2018).

Gross motor skills are the usage of the larger muscular groups, which enables a child to accomplish activities, which are often broader and more vigorous than fine motor skills (Mauro, 2022). Walking, kicking, jumping, and ascending stairs are some of these motions. Certain gross motor milestones, like throwing or catching a ball, also need eye-hand coordination.

The progression of typical motor skill development is predictable (Zeng, Ayyub, Sun, Wen, Xiang, and Gao, 2017). The inner body, which includes the head, neck, arms, and legs, is where it begins. From there, it proceeds to the outer body, which includes the hands, feet, fingers, and toes. Since motor development is linked to other developmental areas, motor development is crucial throughout a child's early years (Gao *et al.*, 2018). For instance, having gross motor abilities like the ability to crawl or walk makes it easier for a child to explore their physical surroundings, which influences cognitive growth. After a child can speak, eat, and drink, their social and emotional development advances (fine motor skills). There are four phases of motor development that children need to go through to obtain these skills, namely, the reflexive movement phase, the rudimentary movement phase, the fundamental movement phase, and the specialized movement phase (Newell, 2020).

The foetus and newborn reflecting movements are the earliest stage of motor development. Reflexive actions are under subcortical control. They happen before and at the same time as the emergence of basic motor skills. The basic purpose of this is to combine a sensory and motor activity for survival. Infants start to develop rudimentary motions not long after birth and continue up to the age of two. They involve locomotor actions like crawling, walking, and creeping. They also involve stability movements, such as learning to regulate the head, neck, and trunk, as well as learning to sit and stand unassisted, as well as manipulative experiences like reaching for and releasing things. To achieve mechanically mature levels of performance in a range of fundamental motions, one must advance from the beginner stage to the elementary stage and then the mature stage. Specific movement abilities closely associated with sports, are brought about when the fundamental movements are more complex and highly developed. A child who masters full body

awareness and control gains a sense of value and confidence which is crucial to their behaviour and future learning.

The body's capacity to choose, receive, and decide whether to react to sensations is a prerequisite for movement. Brain activity can begin without the aid of sensory stimulation, or it can be sparked by sensory input originating from one of the senses. Considering it carefully may come after making this choice. Hence, decision-making is a crucial component of both cognitive and motor development (Newell, 2020).

2.3 Theoretical Framework – Cognitive Development Theory

Cognitive Development Theory, proposed by Jean Piaget (1967), is a foundational theory in the field of psychology that focuses on the cognitive growth and maturation of individuals. Piaget's theory revolutionized our understanding of how children learn and develop, emphasizing the active construction of knowledge through interactions with the environment (Babakr, Mohamedamin and Kakamad, 2019).

Piaget's Cognitive Development Theory is built around several key assumptions. It posits that children are active learners who actively construct their understanding of the world through assimilation (integrating new experiences into existing mental schemas) and accommodation (adapting existing schemas to fit new experiences). According to Piaget, cognitive development occurs through a series of distinct stages: the sensorimotor stage (birth to age two), the preoperational stage (ages two to seven), the concrete operational stage (ages 7 to 11), and the formal operational stage (ages 11 and above). Each stage is characterized by specific cognitive abilities and limitations (Babakr, Mohamedamin and Kakamad, 2019).

From birth and lasting until 18 to 24 months of age is the sensorimotor stage. Children are physically exploring their world and learning through their senses of smell, sight, touch, taste, and hearing when in the sensorimotor period (Babakr, Mohamedamin and Kakamad, 2019). Object permanence, refers to the ability to know that an object is still there even though one can no longer see it is the most crucial skill developed during the sensorimotor stage. For instance, if a toy is hidden by a blanket, the child will still be aware of its presence and search for it. Without this ability, the child assumes the toy has just vanished. The sensorimotor period is also when language development starts (Babakr, Mohamedamin and Kakamad, 2019).

According to Piaget's theory of cognitive development, the preoperational stage takes place between the ages of two and seven. Children pick up the ability of symbolic representation early on in this stage. This implies that an item or phrase can signify a different matter. A child might use a cardboard box to play "house" as an example. Children at this age tend to put themselves first and believe that everyone else thinks and feels the same way they do. Egocentrism is the term for this. Another trait of the preoperational phase is centricism (Cherry, 2022). This indicates that a child can only concentrate on one facet of a scenario or problem. Even if their own piece of candy is larger, a child may become irritated if a friend has more than they do. Children will frequently play beside one another throughout this stage (referred to as parallel play), but not with one another. Children also think that toys and other inanimate items, like them, have souls and emotions (Cherry, 2022)

Ages seven to 11 is when the concrete operational stage takes place. A child's capacity for logical thought and problem-solving grows during this period, but they are limited to using these abilities with "concrete" or tangible objects. In this stage, there are six main concrete activities that emerge. In the conservation stage, a kid has learned that even if an object changes in appearance, its quantity or number remains constant (Cherry, 2022). For instance, the appearance of a cup of milk in a tall glass versus the same quantity of milk in a short glass differs, but the amount remains the same.

The ability to categorize things by groups, such as colour, form, or size, is known as classification (Cherry, 2022). The ability to arrange things in a sequence or logical order is known as seriation. The child could, for instance, arrange the blocks from smallest to largest. The ability to grasp that a procedure can be reversed is known as reversibility competence. For instance, a balloon can be inflated with air and subsequently deflated to its initial state. Decentering enables a child to concentrate on multiple facets of a scenario or problem at once. For instance, although having identical exteriors, two candy bars may have differing interior flavours that the child is aware of. Understanding transitivity helps one to comprehend how objects relate to one another (Cherry, 2022). John is older than Joey, for instance, if Susan is older than Joey and John is older than Susan.

The final phase of Piaget's theory of cognitive development takes place from adolescence to maturity. The ability to think abstractly and solve hypothetical problems is acquired during this period (Cherry, 2022). This stage also involves learning deductive thinking, or the

capacity to draw conclusions from data obtained from one's surroundings. This entails, for instance, that a person may distinguish between dogs of different breeds rather than lumping them all together under the umbrella term "dogs."

The relevance of Cognitive Development Theory in terms of the impact of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners is evident in several ways. The sudden shift to remote learning modalities and reduced face-to-face interactions due to school closures can disrupt the typical cognitive development of Grade R learners. Piaget's theory emphasizes the importance of active engagement with the environment, social interactions, and hands-on experiences for cognitive growth. The limitations of remote learning, such as reduced opportunities for peer collaboration and experiential learning, can impede the development of cognitive skills among Grade R learners.

The theory highlights the significance of the socio-cultural context in cognitive development. The COVID-19 pandemic has brought about significant changes in the social environment of Grade R learners. Physical distancing measures limited social interactions, and disrupted routines can affect the socio-cultural factors that contribute to cognitive development. For example, Piaget (Cherry, 2022) emphasized the role of language development in cognitive growth, and reduced opportunities for face-to-face communication and language-rich interactions, which can hinder language acquisition and subsequent cognitive development among Grade R learners during the pandemic.

Recent studies have applied Cognitive Development Theory to examine the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners. For instance, the review titled "Children's Only Profession: Playing with Toys" discusses the crucial role of playing in children's cognitive, motor, psychosocial, emotional, and linguistic development. It emphasizes the significance of play in raising self-confident, creative, and happy children (Dag, Turkkan and Dag, 2021). The article cites Piaget's cognitive development theory, highlighting the importance of games and toys in supporting children's cognitive growth. It also highlights the importance of recognizing play as a child's fundamental right and encourages health-care professionals, especially paediatricians and family physicians, to promote play and toy selection to ensure the healthy development and happiness of children. Research has explored the effects of remote learning on cognitive processes and skill acquisition. Studies, such as Negative Impacts From the Shift to Online Learning During the COVID-19 Crisis: Evidence From a Statewide

Community College System (Bird, Castleman and Lohner, 2022), have found that the shift to online platforms or take-home materials may limit the hands-on experiences and social interactions that are crucial for cognitive development. This aligns with Piaget's theory, which emphasizes the importance of active exploration and social engagement in cognitive growth (Dag, Turkkan and Dag, 2021).

The study "*Enrich Schematization in Children: Play as The Tool for Cognitive Development*" focuses on how play, based on the Piagetian cognitive development theory, can be utilized as a tool to enrich cognitive development in children (Bhagat, Haque and Jaalam, 2018). The article emphasized the importance of play as a tool to promote cognitive progress and schematization in children. The study highlights the different stages of cognitive development and provides guidelines for age-related play that can be used by parents and teachers to enrich children's schemas and promote cognitive growth. The researcher proposes that by understanding and using play as a tool, support is given to children's intellectual adaptation and creates a more meaningful mental schema of their environment, leading to better cognitive development. The article concludes that enriching play experiences may have a significant impact on children's cognitive development, regardless of whether they are typically developing or have neurodevelopmental issues (Bhagat, Haque and Jaalam, 2018).

Moreover, studies have examined the impact of reduced physical activities on motor skill development during the pandemic. The closure of schools and restrictions on outdoor activities have resulted in decreased opportunities for gross and fine motor skill development. The study "Impact of COVID-19 on Early Childhood Educator's Perspectives and Practices in Nutrition and Physical Activity: A Qualitative Study" aimed to explore the perspectives of early childhood educators regarding the impact of COVID-19 guidelines on nutrition and physical activity practices in early childhood education and care (ECEC) environments (Lafave, Webster and McConnell, 2021). The study used cognitive development theory as a basis for understanding the importance of ECEC experiences in shaping healthy eating and physical activity behaviours, which can have long-term effects on a child's well-being and the prevention of chronic diseases.

The findings revealed several key impacts of COVID-19 guidelines on nutrition and physical activity practices in ECEC environments. There was a reduction in the availability of quality food for children, which was accompanied by an increase in outdoor opportunities

and perceived physical activity time. Teaching practices were affected, as the guidelines disrupted curriculum, life skills, and social connectedness related to healthy eating education. The promotion of physical activity education has also faced challenges due to equipment, space, and curriculum enrichment losses.

Overall, the study highlighted significant negative effects of COVID-19 guidelines on nutrition and physical activity best practices within ECEC environments (Lafave, Webster and McConnell, 2021). It emphasized the importance of supporting educators in maintaining healthy and active environments for preschoolers while adhering to guidelines to minimize the risk of COVID-19 transmission. These findings resonate with Piaget's theory, which recognizes the role of physical exploration and sensorimotor experiences in motor skill acquisition.

In summary, Cognitive Development Theory, propounded by Jean Piaget (1976) provides a valuable framework for understanding the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners. The theory emphasizes the active construction of knowledge, the role of social interactions, and the importance of the socio-cultural context in cognitive development. Recent studies have applied the theory to examine the effects of remote learning and reduced physical activities on cognitive and motor skill development during the pandemic. By integrating Piaget's theory into research and educational practices, we can gain insights into the challenges faced by Grade R learners and design interventions that support their optimal cognitive and motor skill development during the pandemic.

2.4 Review of related empirical studies

2.4.1 Effect of the level of cognitive skill development on learning outcomes

Numerous studies have explored the profound impact of cognitive skill development on learning outcomes, shedding light on the critical relationship between these two factors. Research in early childhood education has consistently demonstrated that well-developed cognitive skills, such as working memory and attention, significantly contribute to better academic performance and language development. In a recent study titled "The Development of Academic Achievement and Cognitive Abilities: A Bidirectional Perspective" by Peng and Kievit (2021). The purpose of the study is to examine the bidirectional relations between academic achievement (specifically reading and mathematics) and cognitive abilities (working memory, reasoning, and executive function) aimed to determine whether

these factors predict each other in development and how direct academic instruction influences the development of cognitive abilities.

The researchers (Peng and Kievit, 2021) also investigate the potential impact of disadvantages, such as special needs or low socioeconomic status, on the bidirectional relations between cognitive abilities and academic achievement. The study design is a review of recent research on the topic, including meta-analyses and individual studies. The authors synthesize the findings from these studies to provide an overview of the bidirectional relations between academic achievement and cognitive abilities.

The sample of the study consists of the research studies included in the review. These studies encompass various age groups, ranging from early childhood to adulthood, and include typically developing individuals as well as those with special needs or low socioeconomic status.

The instrument for data collection is not explicitly mentioned in the article since it is a review of existing research. However, the studies included in the review likely used a variety of measures and assessments to assess academic achievement (reading and mathematics skills) and cognitive abilities (working memory, reasoning, and executive function).

The method of data analysis is a synthesis of the findings from the reviewed studies. The authors summarize the results of each study and identify common patterns and trends across the research literature.

The major findings of the study suggest that reading, mathematics and cognitive abilities predict each other in development, indicating a bidirectional relationship. The researchers also find that direct academic instruction positively influences the development of reasoning. Additionally, it is noted by Peng and Kievit (2021), that the bidirectional relations between cognitive abilities and academic achievement may be weaker among children with disadvantages, such as those with special needs or low socioeconomic status.

The reviewed study is consistent with the thesis by highlighting that cognitive skills play a crucial role in information retention and recall. A well-trained memory facilitates the storage and retrieval of knowledge, allowing students to retain and apply learned information efficiently. Enhanced attention and focus help learners engage with course materials and avoid distractions, leading to more meaningful learning experiences.

However, the reviewed study also highlights some differences compared to other studies. For example, the findings suggest that the bidirectional relations between cognitive abilities and academic achievement may be weaker among children with disadvantages (Peng and Kievit, 2021). This finding adds nuance to the understanding of the bidirectional relationship and emphasizes the importance of considering contextual factors, such as socioeconomic status, when examining these relations.

Overall, the reviewed study contributes to the existing literature by synthesizing recent research on the bidirectional relations between academic achievement and cognitive abilities. It provides valuable insights into the mutual influence of these factors and highlights the potential implications for education and cognitive training. Further research is recommended to investigate age effects, measurement issues, and potential moderators of the bidirectional relations.

The level of cognitive skill development significantly impacts learning outcomes across various domains of education. A study by Noor, Saim, Alias, and Rosli (2020), "Students' Performance on Cognitive, Psychomotor and Affective Domain in the Course Outcome for Embedded Course", investigates the students' performance in the cognitive, psychomotor, and affective domains for two embedded courses in civil engineering (Basic Hydraulics and Basic Soil Mechanics). The study aims to assess how students perform in each domain and determine if there is any correlation between the three domains.

The study is based on quantitative research. Data was collected from 336 students of Basic Hydraulics and 406 students of Basic Soil Mechanics. The assessment for the embedded courses consisted of 60% for the cognitive domain, 30% for the psychomotor domain, and 10% for the affective domain (Noor, Saim, Alias, and Rosli, 2020). The cognitive domain was assessed through a final examination, while the psychomotor and affective domains were assessed through laboratory work and observations, respectively.

The sample consisted of 336 students of Basic Hydraulics and 406 students of Basic Soil Mechanics, totalling 742 participants from a civil engineering diploma program at a public university in Malaysia (Noor, Saim, Alias, and Rosli, 2020). The data collection instrument included final examination scores for the cognitive domain, practical test scores for the psychomotor domain, and observations for the affective domain. Specific rubrics were used to guide the assessment in each domain. The researchers used simple frequency counts to analyse students' performance in each domain. Additionally, Spearman's (Noor,

Saim, Alias, and Rosli, 2020). rank-order correlation coefficient was used to identify any correlation between students' performance in the cognitive, psychomotor, and affective domains.

The study found that students performed better in the psychomotor and affective domains compared to the cognitive domain. The results showed a positive correlation between the students' performance in each domain, indicating that increased marks in one domain were related to increased marks in the other domains.

The study's findings support this thesis by emphasizing the importance of when cognitive skills are well-developed, learners can analyse complex problems, evaluate multiple perspectives, and make informed decisions. Critical thinking skills enable them to question assumptions, identify logical fallacies, and construct coherent arguments. The study also aligns with the outcomes-based education approach, which seeks to develop competent and skilled learners who can apply theory and skills in real-world settings.

However, the study's focus on civil engineering courses and the specific assessment methods used might limit its generalizability to other disciplines or educational contexts. Further research in different academic fields and with varied assessment techniques would provide a more comprehensive understanding of students' performance across domains. Additionally, comparing the results of this study with similar research conducted in different countries and cultural settings could offer insights into the universality of the findings.

In conclusion, the studies examining the effect of cognitive skills development on learning outcomes provide compelling evidence for its significant influence at various stages of life. The findings underscore the importance of nurturing cognitive abilities from early childhood, as they form the bedrock for future academic achievement and success. Understanding and promoting cognitive skill development not only contribute to enhanced academic performance, but also foster lifelong learning and cognitive adaptability, empowering individuals to navigate an ever-evolving world with confidence and competence.

2.4.2 Influence of the level of motor skill development on learning outcomes

The COVID-19 pandemic has reshaped the landscape of education in profound ways, and one area that has experienced a significant impact is the motor skills development of learners. With schools around the world implementing remote learning measures and re-

stricting physical interactions, students have faced limitations on their opportunities to engage in physical activities and practice essential motor skills. The article, by Rossi, Behme and Breuer (2021), titled "Physical Activity of Children and Adolescents during the COVID-19 Pandemic—A Scoping Review," aims to review the evidence on the effects of COVID-19 restrictions on the physical activity levels of children and adolescents and identify the determinants influencing their physical activity behaviors during the pandemic.

The primary purpose of the study is to examine how COVID-19 restrictions affected the physical activity behavior of children and adolescents. It also aims to identify individual and context-specific factors that determine the physical activity behavior of this age group during the pandemic. The study employs a scoping literature review approach to collect and analyze relevant research on physical activity behaviors before and during the COVID-19 pandemic. The study includes a total of 84 empirical and peer-reviewed studies that investigate physical activity levels among children and adolescents during the pandemic (Rossi, Behme and Breuer, 2021). The samples in these studies encompass children and adolescents up to 18 years of age. Data for the scoping review were collected from databases such as PubMed, Web of Science, SportDiscus, and BISP-Surf. The studies included in the analysis used various data collection methods, including online surveys, phone interviews, semi-structured interviews, fitness, or motor competence assessments, accelerometer, and more.

Due to the heterogeneity of outcome measures, a meta-analysis could not be conducted. Therefore, the studies were synthesized using a narrative review approach. The data was summarized in an Excel spreadsheet, and the studies' characteristics and main results were analyzed. The scoping review revealed a decrease in physical activity among children and adolescents during the COVID-19 pandemic. The decrease ranged between -45 minutes per day to -91 minutes per day (Rossi, Behme and Breuer, 2021). If an increase in physical activity was detected, it was associated with unstructured and outdoor activities. The main determinants of physical activity during the pandemic were age, gender, socioeconomic background, outdoor environment, routines, and prior physical activity experiences. The pandemic has exacerbated the problem of inactivity, especially among older children, females, and those from lower socioeconomic backgrounds.

This scoping review complements existing literature by specifically focusing on the effects of COVID-19 restrictions on physical activity levels among children and adolescents. It provides valuable insights into the determinants influencing physical activity behaviors during the pandemic, emphasizing the role of individual and contextual factors. The study's methodology, which includes a comprehensive search across multiple databases, strengthens the validity of its findings. However, it also highlights the need for consistent measurement standards of physical activities across studies to ensure comparability of results in future research.

While other reviews, such as *Impact of COVID-19 on physical activity: A rapid review* by Park, Zhong, Yang, Jeong and Lee (2022), have addressed the impact of the COVID-19 pandemic on physical activity behaviors in general, this scoping review specifically focuses on the effects on children and adolescents. Moreover, it identifies individual and context-specific determinants that influence physical activity levels during the pandemic. The review also acknowledges the limitations and gaps in the existing research, urging for further investigation, especially in underrepresented regions such as Africa and Asia (Rossi, Behme and Breuer, 2021).

Overall, this scoping review provides important insights into the effects of COVID-19 restrictions on the physical activity of children and adolescents, highlighting the need for targeted interventions and policies to address the negative impact on their physical health and well-being. It offers valuable information for policymakers, educators, and researchers to develop strategies that promote physical activity among young populations during times of restrictions and beyond.

The pandemic-induced disruption to regular routines and reduced access to outdoor spaces and recreational facilities have presented unique challenges for learners' physical development. In the article "Changes in Physical Fitness during COVID-19 Pandemic Lockdown among Adolescents: A Longitudinal Study", by Zhou, Zhai, Wu, Koriyama, Wang, Jin, Li, Sawada and Fan (2022), explores the impact of the COVID-19 pandemic lockdown on physical fitness among adolescents and investigate the effect of initial physical fitness indicators on changes during the lockdown. This essay delves into the consequences of the COVID-19 pandemic on the motor skill development of students and explores potential strategies to mitigate these effects, ensuring a holistic approach to their

growth and well-being. The researchers aimed to identify potential changes in various physical fitness indicators and assess how lockdown affected different aspects of physical fitness in this age group.

The study followed a longitudinal design, observing the same group of adolescents over time. Physical fitness measurements were collected at two time points - before the COVID-19 lockdown (November 2019) and after the lockdown (July 2020). This design allowed researchers to assess changes in physical fitness indicators before and after the lockdown period. The sample consisted of 265 adolescents aged 14.1 ± 0.4 years old from a junior high school in Fujian, China. The participants were divided into two groups, with 150 boys and 115 girls. The researchers used a standardized physical fitness measurement protocol based on the revised 2014 Chinese National Student Physical Fitness Standard (CNSPFS). The measurements included vital capacity, 50-m sprint, sit and reach, standing long jump, timed sit-ups, pull-ups, 800-m run, and 1000-m run.

The researchers conducted statistical analyses to compare physical fitness indicators between baseline and follow-up, using paired t-tests. They also calculated the changes (delta) in physical fitness by subtracting the baseline data from the follow-up data. Pearson correlation coefficients and partial correlation coefficients were used to examine associations between physical fitness at baseline and changes during the lockdown. Additionally, the participants were divided into Tertial groups based on their initial physical fitness indicators, and one-way ANOVA and ANCOVA were used to compare mean changes among these groups. The study found that during the COVID-19 lockdown, certain physical fitness indicators improved, while others deteriorated. Vital capacity, flexibility (sit and reach), and muscular strength (pull-ups) showed significant improvement in both boys and girls. However, aerobic fitness (800-m or 1000-m run) and explosive force (50-m sprint) significantly declined in all adolescents. The reduction in physical fitness was more pronounced in adolescents with higher physical fitness levels before the lockdown.

This study adds valuable information to the existing literature focusing on the impact of the COVID-19 pandemic on the physical fitness in adolescents. While many studies have focused on decreased physical activity levels during lockdowns, this study specifically examines changes in physical fitness indicators over time. The findings align with previous re-

search showing a decline in aerobic fitness and explosive force during lockdowns but also highlight the positive effects on certain physical fitness aspects.

The longitudinal design of this study sets it apart from cross-sectional studies which only provide a snapshot of physical fitness during a specific time. By tracking the same group of adolescents over time, this study offers a more comprehensive understanding of how physical fitness changed during the pandemic lockdown. Moreover, the examination of different physical fitness indicators, such as vital capacity and muscular strength, provides a more detailed picture of the overall impact of lockdown on adolescents' physical fitness. However, comparisons to other studies might be limited due to variations in lockdown durations and populations studied.

2.4.3 Impact of the COVID-19 pandemic on the cognitive skill development of learners

The COVID-19 pandemic has left an indelible mark on various aspects of our lives, and one critical area significantly affected is education. With the widespread closure of schools and a rapid shift to online learning, the cognitive skill development of learners has faced unprecedented challenges. In the article "Impact of the COVID-19 Pandemic Environment on Early Child Brain and Cognitive Development", the study aims to investigate the impact of the COVID-19 pandemic environment on early child brain and cognitive development (Deoni, Beauchemin, Volpe and Resonance Consortium, 2021). It seeks to assess the cognitive scores of children born during the pandemic compared to those born in the preceding decade and examine the longitudinal trends of brain cognitive domain measures before and during the pandemic.

The study utilizes a longitudinal design and leverages a large ongoing study of child neurodevelopment. It compares data from children born between 2020 and 2021 (n=118) to data from the preceding decade (2011-2019, n=554) (Deoni, Beauchemin, Volpe and Resonance Consortium, 2021). General childhood cognitive scores are assessed using the Mullen Scales of Early Learning, and brain neuroimaging (MRI) is performed on each child (Deoni, Beauchemin, Volpe and Resonance Consortium, 2021). Longitudinal mixed-effects models are employed to compare brain cognitive domain measures before and during the pandemic.

The sample consists of 672 children between zero and three years of age. Data is collected from children born between 2020 and 2021 and compared to data from children born between 2011 and 2019. The Mullen Scales of Early Learning is used to assess general childhood cognitive scores. Brain neuroimaging is conducted using MRI to examine brain white matter development. Longitudinal mixed-effects models were used to analyse the data and compare the longitudinal trends of brain cognitive domain measures before and during the pandemic. Statistical analyses are employed to determine significant differences in cognitive performance between children born during the pandemic and those born pre-pandemic (Deoni, Beauchemin, Volpe and Resonance Consortium, 2021).

The study found that children born during the COVID-19 pandemic have significantly reduced verbal, motor, and overall cognitive performance compared to children born before the pandemic. It also reveals that skills continue to decline as the pandemic progresses. Additionally, the study shows that children from lower socioeconomic families are most affected. The neuroimaging data supports these findings, indicating reduced brain white matter development in children born since July 2020 compared to their counterparts from 2011 to 2019.

This study aligns with other research examining the impact of the COVID-19 pandemic on early child development, particularly brain and cognitive development. Several studies have reported similar findings of reduced cognitive performance and delayed development among children born during the pandemic. However, this study contributes to the existing literature by incorporating longitudinal data, examining brain cognitive domain measures, and highlighting the influence of socioeconomic factors on the observed outcomes.

This study differs from others by specifically focusing on the impact of the pandemic environment on early child brain and cognitive development. The use of longitudinal data allows for an assessment of trends over time, providing valuable insights into the progression of cognitive decline during the pandemic. Additionally, the inclusion of brain neuroimaging data adds objective measures of brain white matter development, enhancing the understanding of the neural correlates of cognitive performance.

Overall, this study underscores the negative impact of the COVID-19 pandemic environment on early child brain and cognitive development. The findings emphasize the need for continued research and support to mitigate the long-term consequences of the pandemic on children's development.

A result of the impact of the pandemic is the impact on cognitive skill development has been substantial, raising concerns about the long-term implications for the academic and personal growth of learners. Deoni, Beauchemin, Volpe, D'Sa, RESONANCE Consortium and Resonance Consortium (2021) investigated "The COVID-19 Pandemic and Early Child Cognitive Development: A Comparison of Development in Children Born During the Pandemic and Historical References." The study aims to characterize cognitive function in children under three years of age over the past decade and investigate whether children exhibit different cognitive development profiles during the COVID-19 pandemic.

The study utilizes a retrospective design and analyzes neurocognitive data collected from 700 healthy and neurotypically developing children between 2011 and 2021. The Mullen Scales of Early Learning (MSEL) instrument is used to assess cognitive development. The study compares MSEL composite measures from 2020 and 2021 to historical values from 2011 to 2019. Additionally, a sub-cohort analysis compares infants born during the pandemic to those born prior, considering factors such as socioeconomic status, birth outcome history, and maternal stress.

The sample includes 700 healthy and neurotypically developing children aged under three years. The study analysed data from infants born between 2011 and 2021, with a specific focus on infants born during the pandemic. The Mullen Scales of Early Learning (MSEL) is the instrument used to collect neurocognitive data. The MSEL assesses general cognition, verbal development, and non-verbal development in young children.

The study compared MSEL composite measures from 2020 and 2021 to historical values using statistical analysis. It also conducts sub-cohort analyses to compare infants born during the pandemic to those born prior. The analyses include measures of socioeconomic status, birth outcome history, and maternal stress as covariates.

The study reveals a significant decline in mean population MSEL measures in 2021 compared to historical references. Infants born during the pandemic demonstrate significantly reduced verbal, non-verbal, and overall cognitive performance compared to children born pre-pandemic. Maternal stress does not appear to be associated with the observed declines, while a higher socioeconomic status is found to be protective.

This study contributes to the growing body of research examining the impact of the COVID-19 pandemic on early childhood cognitive development. While the specific findings may vary, several other studies have also reported negative effects on cognitive development during the pandemic. However, this study stands out by analysing a large sample over a decade and comparing the cognitive development of children born during the pandemic to historical references. The inclusion of socioeconomic status and other covariates adds valuable insights to understanding the potential factors influencing cognitive outcomes.

This study differs from others by utilizing a historical comparison group, allowing for a direct comparison of children born during the pandemic with those born in previous years. The use of the MSEL instrument for data collection also provides standardized and well-established measures of cognitive development (Deoni, Beauchemin, Volpe and Resonance Consortium, 2021). Additionally, the study investigates the role of socioeconomic status and maternal stress, providing a more comprehensive understanding of the potential factors influencing cognitive outcomes during the pandemic.

Overall, this study sheds light on the impact of the COVID-19 pandemic on early child cognitive development. The findings underscore the need for further research to explore the underlying factors contributing to the observed decline in cognitive performance and to inform interventions and support for children's development during and after the pandemic.

2.4.4 Impact of COVID-19 pandemic on the motor skill development of learners

The COVID-19 pandemic has reshaped the landscape of education in profound ways, and one area that has experienced a significant impact is the motor skills development of learners. With schools around the world implementing remote learning measures and restricting physical interactions, students have faced limitations regarding opportunities to engage in physical activities and practice essential motor skills.

The article by Rossi, Behme and Breuer (2021), titled "Physical Activity of Children and Adolescents during the COVID-19 Pandemic—A Scoping Review," aimed to review the evidence on the effects of COVID-19 restrictions on the physical activity levels of children and adolescents and identify the determinants influencing their physical activity behaviors during the pandemic. The primary purpose of the study is to examine how COVID-19 re-

restrictions affected the physical activity behavior of children and adolescents. It also aimed to identify individual and context-specific factors that determine the physical activity behavior of this age group during the pandemic.

The study employs a scoping literature review approach to collect and analyze relevant research on physical activity behaviors before and during the COVID-19 pandemic (Rossi, Behme and Breuer, 2021). The study included a total of 84 empirical and peer-reviewed studies that investigate physical activity levels among children and adolescents during the pandemic. The samples in these studies encompass children and adolescents up to 18 years of age. Data for the scoping review were collected from databases such as PubMed, Web of Science, SportDiscus, and BISP-Surf (Rossi, Behme and Breuer, 2021). The studies included in the analysis used various data collection methods, including online surveys, phone interviews, semi-structured interviews, fitness, or motor competence assessments, accelerometer, and more (Rossi, Behme and Breuer, 2021).

Due to the heterogeneity of outcome measures, a meta-analysis could not be conducted. Therefore, the studies were synthesized using a narrative review approach. The data were summarized in an Excel spreadsheet, and the studies' characteristics and main results were analyzed.

The scoping review revealed a decrease in physical activity among children and adolescents during the COVID-19 pandemic. The decrease ranged between -45 minutes per day to -91 minutes per day. If an increase in physical activity was detected, it was associated with unstructured and outdoor activities. The main determinants of physical activity during the pandemic were age, gender, socioeconomic background, outdoor environment, routines, and prior physical activity experiences. The pandemic has exacerbated the problem of inactivity, especially among older children, females, and those from lower socioeconomic backgrounds.

This scoping review complements existing literature by specifically focusing on the effects of COVID-19 restrictions on physical activity levels among children and adolescents. It provides valuable insights into the determinants influencing physical activity behaviors during the pandemic, emphasizing the role of individual and contextual factors. The study's methodology, which includes a comprehensive search across multiple databases, strengthens the validity of its findings. However, it also highlights the need for consistent

measurement standards of physical activity across studies to ensure comparability of results in future research.

While other reviews have addressed the impact of the COVID-19 pandemic on physical activity behaviors in general, this scoping review specifically focuses on the effects on children and adolescents. Moreover, it identifies individual and context-specific determinants that influence physical activity levels during the pandemic. The review also acknowledges the limitations and gaps in the existing research, urging for further investigation, especially in underrepresented regions like Africa and Asia.

Overall, this scoping review provides important insights into the effects of COVID-19 restrictions on the physical activity of children and adolescents, highlighting the need for targeted interventions and policies to address the negative impact on their physical health and well-being. It offers valuable information for policymakers, educators, and researchers to develop strategies that promote physical activity among young populations during times of restrictions and beyond.

The pandemic-induced disruption to regular routines and reduced access to outdoor spaces and recreational facilities have presented unique challenges for learners' physical development. This essay delves into the consequences of the COVID-19 pandemic on the motor skill development of students and explores potential strategies to mitigate these effects, ensuring a holistic approach to their growth and well-being. The article "Changes in Physical Fitness during COVID-19 Pandemic Lockdown among Adolescents: A Longitudinal Study", by Zhou, Zhai, Wu, Koriyama, Wang, Jin, Li, Sawada and Fan (2022), explored the impact of the COVID-19 pandemic lockdown on physical fitness among adolescents and investigate the effect of initial physical fitness indicators on changes during the lockdown. The researchers aimed to identify potential changes in various physical fitness indicators and assess how lockdown affected different aspects of physical fitness in this age group.

The study followed a longitudinal design, observing the same group of adolescents over time. Physical fitness measurements were collected at two time points - before the COVID-19 lockdown (November 2019) and after the lockdown (July 2020). This design allowed researchers to assess changes in physical fitness indicators before and after the lockdown period. The sample consisted of 265 adolescents aged 14.1 ± 0.4 years old from

a junior high school in Fujian, China. The participants were divided into two groups, with 150 boys and 115 girls. The researchers used a standardized physical fitness measurement protocol based on the revised 2014 Chinese National Student Physical Fitness Standard (CNSPFS). The measurements included vital capacity, 50-m sprint, sit and reach, standing long jump, timed sit-ups, pull-ups, 800-m run, and 1000-m run.

The researchers conducted statistical analyses to compare physical fitness indicators between baseline and follow-up, using paired t-tests. They also calculated the changes (delta) in physical fitness by subtracting the baseline data from the follow-up data. Pearson correlation coefficients and partial correlation coefficients were used to examine associations between physical fitness at baseline and changes during the lockdown. Additionally, the participants were divided into tertial groups based on their initial physical fitness indicators, and one-way ANOVA and ANCOVA were used to compare mean changes among these groups.

The study found that during the COVID-19 lockdown, certain physical fitness indicators improved, while others deteriorated. Vital capacity, flexibility (sit and reach), and muscular strength (pull-ups) showed significant improvement in both boys and girls. However, aerobic fitness (800-m or 1000-m run) and explosive force (50-m sprint) significantly declined in all adolescents. The reduction in physical fitness was more pronounced in adolescents with higher physical fitness levels before the lockdown.

This study adds valuable information to the existing literature on the impact of the COVID-19 pandemic on physical fitness in adolescents. While many studies have focused on decreased physical activity levels during lockdowns, this study specifically examines changes in physical fitness indicators over time. The findings align with previous research showing a decline in aerobic fitness and explosive force during lockdowns but also highlight the positive effects on certain physical fitness aspects.

The longitudinal design of this study sets it apart from cross-sectional studies that only provide a snapshot of physical fitness during a specific time. By tracking the same group of adolescents over time, this study offers a more comprehensive understanding of how physical fitness changed during the pandemic lockdown. Moreover, the examination of different physical fitness indicators, such as vital capacity and muscular strength, provides a more detailed picture of the overall impact of lockdown on adolescents' physical fitness.

However, comparisons to other studies might be limited due to variations in lockdown durations and populations studied.

2.4.5 Impact of other pandemics on learners' motor and cognitive skills development

The World Health Organization labelled the COVID-19 outbreak a pandemic on March 11, 2020. Since then, more than 150 nations worldwide have been forced to respond to a public health emergency of unprecedented scope in modern history due to the newly discovered coronavirus's rapid spread (Bakrania, Chavez, Ipince, Rocca, Onliver, Stansfield and Subrahmanian, 2020). Globally, infection control measures have been adopted due to the characteristics of COVID-19, including quarantine and isolation, physical separation, movement limitations, and the shutdown of non-essential enterprises, services, and schools. To prepare for the inevitable return to socialized life and to create programs and policies that help families in the short and long term, it is essential to comprehend the probable effects of the COVID-19 pandemic on children (Bakrania *et al.*, 2020). Researchers must look at how past and present pandemics and epidemics affected children's mental health, nutrition, academic performance, leisure activities, and family wellness to comprehend this.

An infectious illness outbreak's immediate result, for example, children who lost one or both of their parents, was likewise a major risk factor for poor child protection results (Bakrania *et al.*, 2020). Children who were orphaned during outbreaks and lived with extended families, were in foster care, or were institutionalized were more likely to experience stigmatization, discrimination, and sexual exploitation and abuse. Additionally, they had a higher likelihood of dropping out of school, taking on parental responsibilities for younger siblings, and working as children. Infectious illness outbreaks have a gendered effect on orphans (Smith, 2019). Orphaned females were more likely to end up as child brides or be sexually molested and exploited, whereas orphaned boys were more likely to become child workers, homeless people, or to engage in illegal activities like thievery (Bakrania *et al.*, 2020).

Children and adolescents who are infected as well as those who live with infected people are frequently subjected to stigma and discrimination (Bakrania *et al.*, 2020). They are also important contributors to other adverse outcomes for children and adolescents as well. Children who were thought to live in illness "hotspots" during prior outbreaks were stigma-

tized by peers, teachers, communities, and kin networks (Bakrania *et al.*, 2020). Sometimes stigma affected entire communities, further isolating them from essential services and resources including shelter, water, food, and livelihoods. People were afraid to seek medical help for fear of drawing attention to their diagnosis due to stigma and discrimination. Stigmatization contributed to a series of outcomes that included abandonment and, eventually, homelessness and the unequal allocation of material and emotional support within families. The vulnerabilities and injustices that women and girls experience, including dispossession, disinheritance, and rejection by families and spouses, were made worse by these impacts (Peterman, Potts, O'Donnell, Thompson, Shah, Oetelt-Prigione and Van Gelder, 2020). Children were increasingly working for pay to earn money to cover household needs because of declining household income and the illness or death of the primary breadwinner.

Long school closures and quarantine and lockdown restrictions had a negative economic impact on disadvantaged households and discouraged children from going back to school (Bakrania *et al.*, 2020). Younger children and females were less likely to work outside the home but more likely to labour inside the home, doing chores and other household duties (Peterman *et al.*, 2020). The division of labour during health emergencies and quarantine was influenced by pre-existing gender conventions. This included the necessity to gather extra water and firewood as well as the requirement to care for the family if a member became ill. Increases in girls' early marriage have been linked to financial difficulties and school dropout and have been highlighted as a detrimental coping technique (Deane, 2021). Pregnancy during adolescence and early on was linked to infection prevention techniques (Bakrania *et al.*, 2020). Closing of schools raised the possibility that girls would spend more time with older men and put more strain on families and caregivers due to economic hardship, a shortage of food, and increased pressure on families. Girls and families occasionally utilized transactional sex as a tactic to increase their income or gain access to resources, putting themselves at an increased risk of pregnancy (Deane, 2021).

Children who live with infected persons or with caregiver families may experience more child abuse and maltreatment during and after pandemics and epidemics (Bakrania *et al.*, 2020). Outbreaks of infectious diseases made sexual abuse and violence against women and girls more severe. Higher hazards were present during quarantines and lockdowns, which led to greater household stress, the use of controlling behaviours by offenders, and limited access to services and assistance for victims (Peterman *et al.*, 2020). Violence ex-

posure was also boosted by disruptions to programs for preventing it that were already in place as well as possible safe areas like schools.

Closing or limiting access to services for welfare and protection only serves to increase risk and harm (Bakrania *et al.*, 2020). A lack of basic justice and medical services during the crisis, travel restrictions brought on by checkpoints and quarantines, a fear of contracting an infection that prevents violence victims from seeking medical attention, the expense of pursuing criminal cases, and the rise in unrecorded mediation at a local level all impeded accurate and safe reporting of intimate partner violence, sexual violence, and exploitation (Sandberg and Fondevila, 2022). For women and girls whose job it was to fetch water, access to water and sanitation also affected their exposure to and risks of sexual assault, intimate partner violence, and other forms of abuse (Bakrania *et al.*, 2020). This includes higher chances of being raped or exploited by guards assigned to oversee quarantine. Fear of attack on the road to and within public hospitals and the exorbitant expense of taxis were obstacles to women obtaining medical care (Sandberg and Fondevila, 2022).

2.5 Summary of literature review

This literature review on the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners provides valuable insights into the challenges faced by this vulnerable group of learners. By examining the conceptual framework, theoretical framework, and review of related empirical studies, several key points emerge, highlighting the effects of the pandemic and identifying gaps in the existing research.

Cognitive and motor skills are fundamental to a child's growth and development. However, the COVID-19 pandemic has significantly disrupted the development of these skills among Grade R learners. Factors such as the sudden shift to remote learning modalities, limited access to educational resources and materials, reduced physical activities, and increased screen time have contributed to potential setbacks in skill acquisition. Additionally, the emotional stress and uncertainty brought about by the pandemic may further impact a child's ability to concentrate, learn, and acquire new skills.

Theoretical perspectives such as Piaget's theory of cognitive development theory offer insights into the cognitive and motor skill development of Grade R learners (Piaget, 1976). This theory helps us to understand how the pandemic has likely disrupted or altered these

developmental processes, emphasizing the need for a deeper understanding of the specific impacts.

Empirical studies have provided valuable evidence on the effects of the COVID-19 pandemic on cognitive and motor skill development. Research has focused on the impact of remote learning on skill acquisition, highlighting the challenges faced by Grade R learners in adapting to new modes of instruction. Furthermore, reduced physical activities due to lockdown measures have been found to negatively affect motor skill development. Socio-economic factors have also shown to play a role, with disparities observed in skill outcomes among learners from different backgrounds. Parental involvement, access to educational resources, and supportive learning environments have been identified as key factors in mitigating the negative impacts on skill development.

However, despite the valuable insights gained from existing research, there are significant gaps that need to be addressed. There is a lack of research specifically focusing on the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners. This highlights the need for more targeted studies in this area. Additionally, few studies have examined the long-term consequences and potential catch-up strategies for learners who experienced disruptions during the pandemic. Understanding the lasting effects and designing effective interventions for these learners is crucial.

The influence of various remote learning modalities on cognitive and motor skill development remains understudied. Different modes of remote learning, such as online platforms or take-home materials, may have varying impacts on skill acquisition. Exploring the effectiveness of these modalities can inform the design of future educational interventions. Furthermore, further research is needed to explore the interplay between socio-economic factors and skill outcomes. Understanding how socioeconomic disparities influence skill development and identifying strategies to mitigate these disparities are essential for promoting equitable educational opportunities.

In conclusion, the literature review highlights the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners. The disruption caused by the pandemic and the associated changes in learning environments have created challenges for skill acquisition. Theoretical frameworks and empirical studies have provided valuable insights into these impacts. However, there are significant gaps in the existing research, including a lack of targeted studies, limited exploration of long-term conse-

quences, and an insufficient understanding of the influence of different remote learning modalities and socio-economic factors. Addressing these gaps will contribute to the design of effective interventions and policies to support the cognitive and motor skill development of Grade R learners in the post-pandemic era.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this research was to understand the impacts of COVID-19 on the development of cognitive and motor skills of Grade R learners in Bloemfontein. In this chapter I firstly, described the research paradigm, research approach, as well as the research design for the study. Secondly, I described the study site, population, sample size and sampling procedures and the instruments that I will use to collect my data. Thirdly, I described how to make my research a quality study through measures of instruments' validity and reliability and piloting. Fourthly, I discussed how I collected and analyse the data I would have collected and lastly, the ethical considerations I need to keep the integrity of this research.

3.2 Research paradigm

A research paradigm is the method by which people develop a worldview based on the direction of their topic and the research community, consultants and mentors, and past research experience (Creswell and Creswell, 2018). The worldview is considered a general philosophical orientation about the world and the nature of the research carried out by researchers. The type of beliefs held by individual researchers based on these factors often lead to the use of strong qualitative, quantitative, or mixed methods in their research. For this research, I will use the paradigm of post-positivism.

Post-positivism or positivism hypotheses represent traditional research forms, and these hypotheses are more effective for quantitative research than qualitative research (Creswell and Creswell, 2018). Positivism challenges the traditional concept of the absolute truth of knowledge and admits that when we study human behaviour and actions, we cannot be certain of our knowledge. Research involves making and testing claims, including identifying and testing causality, such as A reason B or A reason B under certain conditions (Leavy, 2017). The questions studied by post-positivists reflect the need to identify and evaluate the reasons that influence the results, such as those found in experiments. In a sense, it is also reductionist. The purpose is to reduce ideas to a small, discrete set for testing, such as variables containing hypotheses and research questions. The development of ob-

served numerical measurements and the study of individual behaviour are crucial for post-positivists (Creswell and Creswell, 2018). Finally, in the scientific method, the research method accepted by post-positivists, researchers start with a theory, collect data to support or refute the theory, and then make the necessary modifications and perform additional tests.

3.3 Research approach

This study adopted a quantitative research approach. Quantitative studies are characterized by a promotional approach to research processes aimed at proven, short or fuse reliability for existing theory (Leavy, 2017). This type of research includes measurements of variables and test relationships between the variables to clarify patterns, correlations, or causality. Researchers can adopt a linear method of data collection and analysis resulting in statistical data. The underlying value of quantitative research includes neutral, objectivity and quite acquisition of knowledge. This approach is generally appropriate when it explains or evaluates its main purpose. Collecting quantitative information enables researchers to perform simple to extremely complex statistical analyses, aggregate data, show relationships between data, or compare aggregated data. Quantitative research includes methods such as questionnaires, structured observations, or experiments.

3.4 Design of the study

The research design refers to the overall chosen strategy to integrate different research components in a coherent and logical way to ensure that you will effectively solve the research problem; form a plan for data collection, measurement, and analysis (Creswell and Guetterman, 2019). The main quantitative design is experimental research and survey research (Leavy, 2017), but for the purpose of this research, Ex-post facto research design was adopted. An ex-post facto research enables a researcher to explore the impact or influence of independent variables on the dependent variable without the manipulation of the independent variables. Thus, this design was considered appropriate in studying the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners.

3.5 Study site

The study area was the Motheo district in Bloemfontein. The Motheo district is made up of different schools comprised of different genders, socio-economic backgrounds, cultures,

ethnicities, language, and race. The resources are also different. While some schools have advanced technology, equipment, and classroom space, others lack it. The research site applies to two schools, not just one, as these schools reflect the population of 747,431 in Bloemfontein.

3.6 Population, sample size and sampling procedures

The site for this study was the Motheo district in Bloemfontein. For this study purposive sampling was used. A purposive sample is a non-probability sample selected according to the general characteristics and objectives of the investigation (Crossman, 2020). This sampling allowed this researcher to focus on two schools with two Grade R classes. The sample for this study comprised all the Grade R learners and their teachers in two schools. This sampling was not randomised as the study required both Grade R learners and educators. Both teachers and learners can be studied in quantitative research. In this study, teachers' perceptions on the impact of COVID-19 on cognitive and motor skills was sought by asking the teachers to fill out a questionnaire on the issue.

3.7 Instruments for data collection

Three instruments namely a questionnaire, Cognitive skills development Test and Motor skills development scale were used for data collection. The questionnaire had three sections A, B and C. Section A contained information on the demographics of the Grade R learners such as gender, Race etc., Section B contained information on the impact of COVID-19 on Grade R learners' cognitive skills development, while section C contained information on the impact of COVID-19 on Grade R learners' motor skills development. The second instrument was Cognitive skill development Test while the third instrument was Motor skills development scale. Collecting data means identifying and selecting people for research, obtaining their research permission, and collecting information by asking people questions or observing their behaviour (Creswell and Guetterman, 2019). It focuses on finding all the contents on a specific topic. For the purposes of this research, survey was used. Survey data is defined as outcome data collected from a sample of respondents who participate in the survey (Levy, 2017). This data is comprehensive information on a specific topic collected from the target audience for research purposes.

3.8 Measures of instruments' validity and reliability and piloting

The instruments for this study were face validated by test development experts and early childhood educators. After the face validation of the instruments, they were pilot tested on appropriate sample which were not part of the study to determine the internal consistency reliability of the items of the instruments. Reliability and validity are concepts used to assess the quality of research (Creswell and Guetterman, 2019). Validity is the degree to which results measure what they should measure (Creswell and Guetterman, 2019). They indicate the degree to which a method, technique, or test measure something. Reliability is related to the consistency of the measurement, and validity is related to the accuracy of the measurement. Reliability refers to the degree to which the results can be reproduced when the survey is repeated under the same conditions. Pilot testing involves conducting surveys before actual research to verify the feasibility and effectiveness of selected methods and technologies in the same field but in a smaller sample (Creswell and Guetterman, 2019). The reliability coefficients for clusters A to D are 0.87, 0.92, 0.80 and 0.85 respectively.

3.9 Data collection procedures

Data collection is the procedure of collecting and measuring information based on the criteria or variables of interest that will answer the stated research question (Bhat, 2019). The importance of data collection is to ensure that the research has integrity, to reduce errors, to minimize the risk of errors in the decision-making process, to save cost and time and finally, to support the need of a new idea, change or innovation (Creswell and Guetterman, 2019). The impact of COVID-19 was measured by collecting two sets of data on the cognitive skills development of the Grade R learners. The first set was their cognitive skill development scores (achievement scores) prior to the emergence of COVID-19 while the second set was their cognitive skills development scores during the COVID-19 to be obtained during field work. Thereafter, the scores prior and during COVID were compared to ascertain the impact of COVID-19. If their cognitive skills development score declined during COVID than prior to COVID, one can conclude that COVID-19 had negative impact on their cognitive skills development.

3.10 Data analysis procedures

Data analysis is the process of verifying, cleaning, transforming, and modelling data (Leavy, 2017). Quantitative data analysis involves many steps. First, a report was provided on the number of sample participants who returned and did not return to the survey. Second, the method used to determine the bias of the response. Third, it provided a descriptive analysis plan for the data collected for all independent and dependent variables in the study. Thus, the data collected for this study was analysed using percentage, mean, standard deviation, and t-test of independent samples. While percentage and mean were used to analyse the data to answer the research questions, t-test of independent samples was used to test the hypotheses.

3.11 Ethical considerations

In quantitative research, one must pay close attention to addressing ethical and legal norms and rules (Creswell and Guetterman, 2019). Research ethics can not only encourage researchers to improve the level of ethical literacy in the research community, but more importantly, reflect on their research projects and processes from the perspective of all potential stakeholders. Therefore, if ethical and legal standards are observed, the rights and interests of everyone involved in the research can be discussed as being protected.

3.11.1 Gaining entry.

The research permission letter is written in relation to a request for a research project in a certain area of interest (Clark-Kazak, 2017). This letter allows one to continue the research project after seeing the benefits of research from a broad perspective. The competent authority of the relevant department issues such a letter to allow the organization or company to further advance its proposal. The letter also discussed the details of the research plan to assist the company. This letter was first sent to the department of education Motheo district. After approval another letter was sent to the principal of the schools selected.

3.11.2 Participants' right

Participants have the right to be informed of what is required of them to participate in research. Be informed of the purpose of the investigation. They should be told what would happen during the study, what they were asked to do, and how long it would last. Know how much of the research is experimental. Learn about all the possible risks, side effects, and discomforts that you may encounter if you decide to participate. If you decide not to

participate, please learn about other available options. Understand how your personal information will be kept confidential. Withdraw from research or refuse to participate at any time without being punished or loss of profit. Discussion on informed consent. This means that researchers should explain the entire study and then give them time to make the right decision for themselves without any pressure. Receive a copy of their consent and information on who to contact if they have any questions.

3.11.3 Informed consent

Informed consent is the basic guarantee of research. The obligation to obtain informed consent derives from respect for those who decide to voluntarily participate in research. For these reasons, no one can be used as an object of research against their will. Thus, participants were given voluntary informed consent before including potential participants in this research protocol. Effective informed consent requires that people have the ability to consent and that they have sufficient knowledge of the subject matter to make a decision. Individual consent must also be voluntary.

3.11.4 Confidentiality

Confidentiality refers to the condition that the researcher knows the identity of the research object but takes measures to protect the identity from being discovered by others (Davis, 2021). In a research environment, confidentiality means not discussing information provided by individuals with others and presenting results in a way that ensures that individuals cannot be identified. In this research, the confidentiality of the participants was ensured by using pseudonyms or fake names to represent the identities of the participants.

3.11.5 Protection from harm

Protection from harm is an ethical and legal commitment to support, respect, and value the dignity and value of participants. Violation of confidentiality regulations is a potential risk of participating in research. To protect the confidentiality of participants, the data in the computer files should be encrypted as soon as possible, the signed consent and other documents should be stored in a locked file cabinet, and the personal identifier should be deleted from the research file as soon as possible.

3.11.6 Achieving anonymity.

Anonymity means that no one participating in the research can access the information and identities of the participants. In other words, even researchers cannot know the identity of

participants. Therefore, in this type of research, the researcher cannot collect personally identifiable information from the participants.

3.11.7 Maintaining professionalism.

Being a professional is about having strong skills and competence in your chosen field. There is a certain obvious expectation that you would have the experience and qualification to deliver your product or service. Professionalism is also about the qualities and behaviours you exhibit, and the way you conduct yourself during your research. As a professional, the researcher will be counted on to find a way to get the job done. Responding to people promptly and following through on promises in a timely manner is also important, as this demonstrates reliability. Professionals are experts in the field they are researching. Professionals adhere to a strict code of ethics. During written or email correspondence, letters and emails need to be brief and to the point. The tone should be polite and formal without being stuffy. Professionals are always accountable for their actions.

3.11.8 Participants' vulnerability

The researcher is aware that every research activity carries the possibility of vulnerability. The researcher looked out for any such possibilities. As the study involved both the learners and their teachers, it is possible that some teachers may feel that they have let down their learners if the fieldwork exposes the possibility of revealing how they might have let the learners down without realising their failures except for the fieldwork encounter with the researcher. That is why 1.11.4 on confidentiality is very important aspect of the study. The researcher took the responsibility to counsel the participants during the fieldwork such that they were assured how they were protected in the study. However, if in any unlikely event of serious psychological challenges because of participating in the fieldwork, such affected participants were referred to receive professional psychological counselling.

3.12 Chapter summary

In summary, the researcher first discussed the paradigm, the research method, and the research design that was implemented. Second, the researcher described the research location, population, sample size, and sampling procedures and tools that were used to collect data. Third, the researcher described how to make the research high-quality research by measuring the effectiveness and reliability of tools and pilots. Fourth, description of how data was collected and analysed was done, and finally, ethical consideration information was outlined and discussed.

CHAPTER 4

PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

The main aim of this study was to explore the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners in the Motheo district of Free State province. This chapter presents the results of data analysis. The study adopted a quantitative research approach; the results are presented in tables. Frequencies means, and standard deviations are used to answer the research questions that guided the study, while independent t-test statistic is used to test the null hypotheses that guided the study at 0.05 level of significance. A total of 150 questionnaires were distributed to respondents, but 143 copies were returned to the researcher. The return rate represents 95.3%.

4.2 DEMOGRAPHIC INFORMATION OF PARTICIPANTS

This section presents the demographic information of the respondents as shown below.

TABLE 4.1: DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Demographics	Categories	n (%)
Gender	Male	0(0.00)
	Female	10(100.00)
Location	Urban	7(70)
	Rural	3(30)
Race	Africans	6(60)
	Whites	4(40)
Years of Teaching Experience	1-2 Years	1(10)
	3-5 Years	1(10)
	6-10 Years	1(10)
	11-15 Years	2(20)
	16-20 Years	2(20)
	21-25 Years	2(20)
	26 Years and above	1(10)

The result of the study as presented in Table 4.1 shows the demographic information of the respondents in the Motheo district. The result shows that all the participants, representing 100% of the Grade R teachers were women. This result indicates that there were

no men teaching Grade R learners in the schools used for this study. With regards to school location, the results shows that seven schools representing 70% are in urban centers, while three schools representing 30% are in rural areas. This indicate that more schools with Grade R classes are in urban centers. Result on the race of respondents shows that six of the participants were Africans representing 60%, while four of the participants representing 40% were Whites, which implies that there were more Africans than Whites teaching Grade R learners in the schools used for this study. With respect to years of teaching experience of Grade R teachers, result shows that one teacher each had 1-2 years, 3-5 years, 6-10 years, and 26 years above of teaching experience representing 10% each of the respondents respectively, while two teachers each had 11-15 years, 16-20 years and 21-25 years of teaching experience representing 20% each of the respondents respectively. This implies that six teachers out of the ten teachers used for this study had between 11-25 years of teaching experience.

4.3 OBJECTIVES OF THE STUDY

The aim of this study is to investigate the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners and provide strategies to develop these skills. The specific objectives of the study include:

4.3.1 To determine the level of cognitive skills development of Grade R learners.

4.3.2 To determine the level of motor skills development of Grade R learners.

4.3.3 To determine the impact of COVID-19 pandemic on the cognitive skills development of Grade R learners.

4.3.4 To determine the impact of COVID-19 pandemic on the motor skills development of Grade R learners.

4.4 RESEARCH QUESTIONS

The main research question of this study is “what are the perceived impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners?” Specifically, four research questions are posed according to the specific objectives to guide the study, they are.

4.4.1 What is the level of cognitive skills development of Grade R learners?

4.4.2 What is the level of motor skills development of Grade R learners?

4.4.3 What is impact of COVID-19 pandemic on the cognitive skills development of Grade R learners?

4.4.4 What is impact of COVID-19 pandemic on the motor skills development of Grade R learners?

4.5 SAMPLING OF PARTICIPANTS

The sample size of this study therefore was 150 Grade R learners and 10 Grade R teachers in the Motheo district. This sample size represents about 5% of the entire population as recommended by Cohen, Manion and Morrison (2018) for a population of few thousands. Multi-stage sampling procedure was adopted in selecting sample for this study. In the first stage, purposive sampling technique was used to select more schools with Grade R classes that are in the urban areas of Motheo district. More urban schools were selected because COVID-19 was more prominent in urban centres and its impact on the cognitive and motor skills development of school children may be more severe than the schools in the rural areas. In the second stage, simple random sampling technique was used to select seven urban schools with Grade R class and three rural schools with Grade R classes. Simple random sampling technique was used to give every school equal chance of being selected for the study. In the third stage, convenience sampling technique was used to select 15 Grade R learners from each of the selected school. Convenience sampling technique was used because according to Cohen *et al.*, (2018), this type of sampling involves choosing the nearest individuals to serve as respondents and continuing that process until the required sample size has been obtained of those who happen to be available and accessible at the time. This implies that only Grade R learners who were in school on the day of researcher's visit were used for the study. In total, 143 questionnaires for Grade R learners were returned and all the ten Grade R teachers returned their rating scale which the researcher used for data analysis. In all total, 153 copies of the instruments were retrieved from the respondents.

4.6 DATA ANALYSIS AND REPORTING

This section presents the result of data analysis based on the research questions that guided the study.

Research Question 1: What is the level of cognitive skill development of Grade R learners?

TABLE 4.2: MEAN AND STANDARD DEVIATION OF RESPONDENTS ON THE LEVEL OF COGNITIVE SKILL DEVELOPMENT OF GRADE R LEARNERS.

SN	Item Statement	Male (n=68)		Female (n=75)		Total (N=143)		Dec
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	
1	Can remember his/her names	4.60	0.77	4.84	0.43	4.73	0.63	SAA
2	Ability to remember other basic facts	3.75	0.93	4.01	0.93	3.89	0.94	AA
3	Ability to remember information learned for testing purpose	3.72	0.92	3.89	0.99	3.81	0.96	AA
4	Ability to do things he/she was asked to do	3.75	0.96	3.83	1.08	3.79	1.02	AA
5	Can remember details of a story that was just read	3.63	1.14	3.67	1.07	3.65	1.10	AA
6	Ability to carry out instruction correctly	3.53	1.07	3.65	1.12	3.59	1.09	AA
7	Can write numbers 1-10 correctly	3.87	1.05	3.93	1.10	3.90	1.07	AA
8	Can recite the 26 alphabets correctly	3.56	1.15	3.72	1.18	3.64	1.16	AA
9	Ability to add simple numbers correctly	3.60	1.03	3.68	1.21	3.64	1.12	AA
10	Ability to count objects correctly	3.90	0.90	4.01	1.14	3.96	1.03	AA
	Cluster Mean	3.79	0.81	3.92	0.88	3.86	0.85	AA

Note: \bar{x} = Mean, SD = Standard Deviation, Above average = (AA) and Average = (A)

The results of the study as presented in Table 4.2 show the mean and standard deviation of respondents on the level of cognitive skills development of Grade R learners in the Motheo district of Free State province. Results show that all Grade R learners can remember their names after COVID-19 pandemic significantly above average (\bar{x} = 4.73, SD = 0.63). This is because the mean rating is within the range of 4.50-5.00 set as criterion for “significantly above average” for the level of cognitive skill development of Grade R learners. Results also show that all the Grade R learners can do the following above average; ability to remember other basic facts (\bar{x} = 3.89, SD = 0.94), ability to remember information learned for testing purpose (\bar{x} = 3.81, SD = 0.96), ability to do things they were asked to do (\bar{x} = 3.79, SD = 1.02), can remember details of a story that was just read (\bar{x} = 3.65, SD = 1.10), ability to carry out instruction correctly (\bar{x} = 3.59, SD = 1.09), can write

numbers 1-10 correctly ($\bar{x} = 3.90$, $SD = 1.07$), can recite the 26 alphabet letters correctly ($\bar{x} = 3.64$, $SD = 1.16$), ability to add simple numbers correctly ($\bar{x} = 3.64$, $SD = 1.12$), and ability to count objects correctly ($\bar{x} = 3.96$, $SD = 1.03$). This decision is taken because the mean ratings are within the range of 3.50-4.49 set as criterion for “above average” for the level of cognitive skill development of Grade R learners. The overall cluster mean rating of 3.86 with a standard deviation of 0.85 shows that the level of cognitive skills development of Grade R learners is Above Average.

Research Question 2: What is the level of motor skill development of Grade R learners?

TABLE 4.3: MEAN AND STANDARD DEVIATION OF RESPONDENTS ON THE LEVEL OF MOTOR SKILL DEVELOPMENT OF GRADE R LEARNERS.

SN	Item Statement	Male (n=68)		Female (n=75)		Total (N=143)		Dec
		\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	
1	Can trace within the lines when coloring	3.59	1.04	3.84	0.93	3.72	0.98	AA
2	Can draw simple designs perfectly	3.41	0.93	3.59	1.04	3.50	0.99	AA
3	Ability to differentiate right from left	3.72	0.91	3.95	0.92	3.84	0.92	AA
4	Ability to print name	3.72	1.07	3.91	1.05	3.82	1.06	AA
5	Ability to appropriate size and spacing of letters when writing	3.35	0.98	3.47	0.92	3.41	0.95	A
6	Ability to appropriate size and spacing of number when writing	3.37	0.92	3.39	0.89	3.38	0.91	A
7	Can stand on one foot for ten seconds	3.72	0.94	3.72	1.04	3.72	0.99	AA
8	Can run around obstacles	3.79	0.90	3.87	0.92	3.83	0.91	AA
9	Can catch a small ball with both hands	3.72	1.00	3.83	1.00	3.78	1.00	AA
10	Can walk along a line	3.85	0.98	3.96	0.90	3.91	0.94	AA
	Cluster Mean	3.62	0.79	3.75	0.72	3.69	0.75	AA

Note: \bar{x} = Mean, SD = Standard Deviation, Above average = (AA) and Average = (A)

Table 4.3 shows the mean and standard deviation of respondents on the level of motor skills development of Grade R learners in Motheo district of Free State province. Results

show that all Grade R learners can do the following, “above average”, these include; are able to trace within the lines when colouring ($\bar{x} = 3.72$, $SD = 0.98$), can draw simple designs perfectly ($\bar{x} = 3.50$, $SD = 0.99$), ability to differentiate right from left ($\bar{x} = 3.84$, $SD = 0.92$), ability to print name ($\bar{x} = 3.82$, $SD = 1.06$), can stand on one foot for ten seconds ($\bar{x} = 3.72$, $SD = 0.99$), can run around obstacles ($\bar{x} = 3.83$, $SD = 0.91$), can catch a small ball with both hands ($\bar{x} = 3.78$, $SD = 1.00$), and can walk along a line ($\bar{x} = 3.91$, $SD = 0.94$). Moreso, results show that on ‘average’, Grade R learners can do the following: ability to appropriate size and spacing of letters when writing ($\bar{x} = 3.41$, $SD = 0.95$) and the ability to appropriate size and spacing of number when writing ($\bar{x} = 3.38$, $SD = 0.91$). The overall cluster mean rating of 3.69 with a standard deviation of 0.75 shows that the level of motor skills development of Grade R learners is Above Average.

Research Question 3: What is the impact of COVID-19 pandemic on the cognitive skill development of Grade R learners?

TABLE 4.4: MEAN AND STANDARD DEVIATION OF RESPONDENTS ON THE IMPACT OF COVID-19 PANDEMIC ON THE COGNITIVE SKILL DEVELOPMENT OF GRADE R LEARNERS (N = 10)

SN	Item Statement	\bar{x}	SD	Dec
1	The pandemic has caused a significant change in how I teach cognitive skills to the learners.	3.20	0.42	A
2	Learners have acquired new barriers that hinder them learning new cognitive skills because of COVID-19.	3.40	0.51	A
3	The activities done in class are insufficient to develop cognitive skills because of COVID-19.	2.50	0.85	A
4	Because of COVID-19, learners have not learned the cognitive skills goals set at the beginning of planning.	3.10	0.87	A
5	Learners are unable to use cognitive skills independently during activities and play because of COVID-19.	2.40	0.51	D
6	Due to the COVID-19 pandemic, the environment is not conducive to learn and apply cognitive skills by learners.	3.30	0.48	A
7	The learners’ cognitive abilities are unsatisfactory for Grade 1 learners as a result of COVID-19 pandemic.	2.50	0.52	A
Cluster Mean		2.91	0.31	A

Note: \bar{x} = Mean, SD = Standard Deviation, Agree = (A) and Disagree = (D)

Table 4.4 shows the mean and standard deviation of respondents on the impact of COVID-19 on cognitive skill development of Grade R learners in Motheo district of Free

State province. Grade R teachers agreed that; the pandemic has caused a significant change in how they teach cognitive skills to the learners ($\bar{x} = 3.20$, $SD = 0.42$), learners have acquired new barriers that hinder them learning new cognitive skills as a result of COVID-19 ($\bar{x} = 3.40$, $SD = 0.51$), the activities done in class are insufficient to develop cognitive skills because of COVID-19 ($\bar{x} = 2.50$, $SD = 0.85$), because of COVID-19, learners have not learned the cognitive skills goals set at the beginning of planning ($\bar{x} = 3.10$, $SD = 0.87$), due to the COVID-19 pandemic, the environment is not conducive to learn and apply cognitive skills by learners ($\bar{x} = 3.30$, $SD = 0.48$) and the learners cognitive abilities are unsatisfactory for Grade 1 learners as a result of COVID-19 pandemic ($\bar{x} = 2.50$, $SD = 0.52$). This is because all the mean ratings are above 2.50 set as criterion for accepting an item. However, the respondents disagreed that learners are unable to use cognitive skills independently during activities and play because of COVID-19 ($\bar{x} = 2.40$, $SD = 0.51$). This is because the mean rating is below 2.50 criterion level. The overall cluster mean rating of 2.91 with a standard deviation of 0.31 shows that COVID-19 had negative impact on the cognitive skill development of Grade R learners in Motheo district of Free State province.

Research Question 4: What is the impact of COVID-19 pandemic on the motor skill development of Grade R learners?

TABLE 4.5: MEAN AND STANDARD DEVIATION OF RESPONDENTS ON THE IMPACT OF COVID-19 PANDEMIC ON THE MOTOR SKILL DEVELOPMENT OF GRADE R LEARNERS (N = 10)

SN	Item Statement	\bar{x}	SD	Dec
1	Learners not being able to socially interact because COVID-19 has impacted their motor skill negatively.	3.50	0.52	A
2	Social distancing has limited how learners can play with their peers outside.	3.60	0.51	A
3	Only certain motor skills can be developed due to the pandemic.	3.30	0.48	A
4	The playground cannot freely be used to develop gross motor skills because of COVID-19.	2.30	0.48	D
5	Due to COVID-19, there are insufficient activities in class that develop fine motor skills.	2.20	0.42	D
6	Due to COVID-19 pandemic, learners have not learned the motor skills goals set at the beginning of planning.	3.00	0.81	A
7	The learners motor abilities are not satisfactory for Grade 1 learners due to COVID-19 pandemic.	2.30	0.48	D

Note: \bar{x} = Mean, SD = Standard Deviation, Agree = (A) and Disagree = (D)

The result of the study as presented in Table 4.5 shows the mean and standard deviation of respondents on the impact of COVID-19 on motor skills development of Grade R learners. Results show that the respondents agreed on the following items; learners not being able to socially interact because COVID-19 has impacted their motor skill negatively (\bar{x} = 3.50, SD = 0.52), social distancing has limited how learners can play outdoors with their peers (\bar{x} = 3.60, SD = 0.51), only certain motor skills can be developed due to the pandemic (\bar{x} = 3.30, SD = 0.48) and due to COVID-19 pandemic, learners have not learned the motor skills goals set at the beginning of planning (\bar{x} = 3.00, SD = 0.81). This is because the mean ratings are above 2.50 set as criterion for accepting an item. On the other hand, respondents disagreed that; the playground cannot freely be used to develop gross motor skills because of COVID-19 (\bar{x} = 2.30, SD = 0.48), due to COVID-19, there are insufficient activities in class that develop fine motor skills (\bar{x} = 2.20, SD = 0.42) and the learners motor abilities are not satisfactory for Grade 1 learners due to COVID-19 pandemic (\bar{x} = 2.30, SD = 0.48). This decision is taken because the mean ratings are below 2.50 criterion level. The cluster mean of 2.88 with a standard deviation of 0.38 indicate that COVID-19 pandemic had negative impact on motor skills development of Grade R learners Motheo district of Free State province.

Test of Hypotheses

The following hypotheses are tested at 0.05 level of significance.

H0₁: There is no significant difference in the level of cognitive skills development of male and female Grade R learners.

TABLE 4.6: T-TEST ANALYSIS OF THE SIGNIFICANT DIFFERENCE IN THE LEVEL OF COGNITIVE SKILL DEVELOPMENT OF MALE AND FEMALE GRADE R LEARNERS.

SN	Gender	N	\bar{X}	SD	t-value	df	p-value	Dec.
1	Male	68	3.79	0.81	-0.931	141	0.35	NS
2	Female	75	3.92	0.88				

Note: NS = Not Significant., $\alpha = 0.05$

The result in Table 4.6 shows the t-test analysis of the significant difference in the level of cognitive skill development of male and female Grade R learners. The result shows that the mean rating for male Grade R learners was 3.79 with a standard deviation of 0.81, while the mean rating for the female Grade R learners was 3.92 with a standard deviation of 0.88. The result further shows that the t-value of -0.931 was obtained with a degree of freedom of 141 and a probability value (p-value) of 0.35. Since the p-value of 0.35 is greater than 0.05 set as level of significance, the null hypothesis is not rejected. Inference drawn therefore is that the difference in the level of cognitive skills development of male and female Grade R learners is not statistically significant.

H0₂: There is no significant difference in the level of motor skill development of male and female Grade R learners.

TABLE 4.7: T-TEST ANALYSIS OF THE SIGNIFICANT DIFFERENCE IN THE LEVEL OF MOTOR SKILL DEVELOPMENT OF MALE AND FEMALE GRADE R LEARNERS.

SN	Gender	N	\bar{X}	SD	t-value	df	p-value	Dec.
1	Male	68	3.62	0.79	-0.99	141	0.32	NS
2	Female	75	3.75	0.72				

Note: NS = Not Significant., $\alpha = 0.05$

The result in Table 4.7 shows the t-test analysis of the significant difference in the level of motor skills development of male and female Grade R learners. Result shows that the mean rating for male Grade R learners was 3.62 with a standard deviation of 0.79, while the mean rating for the female Grade R learners was 3.75 with a standard deviation of 0.72. The result also shows that the t-value of -0.99 was obtained with a degree of freedom of 141 and a probability value (p-value) of 0.32. Since the p-value of 0.32 is greater than 0.05 set as level of significance, the null hypothesis is not rejected. Inference drawn therefore is that the difference in the level of motor skills development of male and female Grade R learners is not statistically significant.

H0₃: There is no significant difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the cognitive skill development of Grade R learners.

TABLE 4.8: T-TEST ANALYSIS OF THE SIGNIFICANT DIFFERENCE IN THE MEAN RATINGS OF TEACHERS FROM URBAN AND RURAL SCHOOLS ON THE IMPACT OF COVID-19 PANDEMIC ON THE COGNITIVE SKILL DEVELOPMENT OF GRADE R LEARNERS.

SN	Location	N	\bar{X}	SD	t-value	df	p-value	Dec.
1	Urban	7	2.85	0.34	-0.879	8	0.41	NS
2	Rural	3	3.05	0.22				

Note: NS = Not Significant., $\alpha = 0.05$

The result in Table 4.8 shows the t-test analysis of the significant difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the cognitive skills development of Grade R learners. Result shows that the mean rating for urban teachers was 2.85 with a standard deviation of 0.34, while the mean rating for the rural teachers was 3.05 with a standard deviation of 0.22. The result further shows that the t-value of -0.879 was obtained with a degree of freedom of 8 and a probability value (p-value) of 0.41. Since the p-value of 0.41 is greater than 0.05 set as level of significance, the null hypothesis which stated that there is no significant difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the cognitive skills development of Grade R learners is not rejected. Inference drawn is that the difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the cognitive skill development of Grade R learners is not statistically significant.

H0₄: There is no significant difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the motor skills development of Grade R learners.

TABLE 4.9: T-TEST ANALYSIS OF THE SIGNIFICANT DIFFERENCE IN THE MEAN RATINGS OF TEACHERS FROM URBAN AND RURAL SCHOOLS ON THE IMPACT OF COVID-19 PANDEMIC ON THE MOTOR SKILL DEVELOPMENT OF GRADE R LEARNERS.

SN	Location	N	\bar{X}	SD	t-value	df	p-value	Dec.
1	Urban	7	2.87	0.41	-0.109	8	0.92	NS

2	Rural	3	2.90	0.16
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Note: NS = Not Significant., $\alpha = 0.05$

The result of the study as presented in Table 4.9 shows the t-test analysis of the difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the motor skills development of Grade R learners. Result shows that the mean rating for urban teachers was 2.87 with a standard deviation of 0.41, while the mean rating for the rural teachers was 2.90 with a standard deviation of 0.16. The result further shows that the t-value of -0.109 was obtained with a degree of freedom of 8 and a probability value (p-value) of 0.92. Since the p-value of 0.92 is greater than 0.05 set as level of significance, the null hypothesis which stated that there is no significant difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the motor skills development of Grade R learners is not rejected. Inference drawn is that the difference in the mean ratings of teachers from urban and rural schools on the impact of COVID-19 pandemic on the motor skills development of Grade R learners is not statistically significant. This means the COVID-19 pandemic affected the motor skills development of Grade R learners in both urban and rural schools.

4.7 CHAPTER SUMMARY

This chapter presents the result of the study from the data collected. The results are presented according to the research questions and null hypotheses which guided the study. The results from the study indicated that both the cognitive and motor skills development of Grade R learners are above average. It was also found that the COVID-19 pandemic had negative impact on the cognitive and motor skills development of Grade R learners in Motheo district of Free State province. All four of the null hypotheses are not rejected, implying that there was no statistically significant difference between the mean ratings of male and female Grade R teachers on the cognitive and motor skills development of Grade R learners and, no statistically significant difference existed between the mean ratings of Grade R teachers in urban and rural schools on the impact of COVID-19 on the cognitive and motor skills development of Grade R learners.

CHAPTER 5

RESULTS, DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 INTRODUCTION

In the endeavour to expand our understanding of the critical field of Early Childhood Care and Education, this study has embarked on a comprehensive investigation into the impacts of the COVID-19 pandemic on the cognitive and motor skills development of Grade R learners in the Motheo district of the Free State province. This section marks the culmination of our research efforts, where we present the results of our study, engage in a thorough discussion of these findings, draw meaningful conclusions, and propose practical recommendations for the benefit of educators, policymakers, and researchers in the field.

5.2 SUMMARY OF MAIN FINDINGS

The findings of the data analysis and reporting can be summarized as follows:

Research Question 1: The study assessed the cognitive skills development of Grade R learners. Results indicate that all Grade R learners in Motheo district of the Free State province demonstrated above-average cognitive skills development. They could remember their names and perform various cognitive tasks, such as recalling basic facts, following instructions, and performing mathematical operations.

Research Question 2: The study evaluated the motor skills development of Grade R learners. The results show that Grade R learners had above-average motor skill development. They could engage in activities like colouring within lines, drawing simple designs, differentiating right from left, and more.

Research Question 3: The impact of the COVID-19 pandemic on the cognitive skills development of Grade R learners was assessed. Teachers reported that the pandemic significantly affected their teaching methods and hindered learners from acquiring new cognitive skills. However, they did not believe that learners were unable to use cognitive skills independently during activities and play.

Research Question 4: The impact of the COVID-19 pandemic on the motor skills development of Grade R learners was examined. Teachers acknowledged that the pandemic had a negative impact on motor skill development. Learners faced challenges like limited

social interaction, restricted outdoor play, and difficulties in accessing appropriate activities.

Hypothesis Testing:

- **H01:** There was no significant difference in the level of cognitive skill development between male and female Grade R learners.
- **H02:** There was no significant difference in the level of motor skills development between male and female Grade R learners.
- **H03:** There was no significant difference in the mean ratings of teachers from urban and rural schools on the impact of the COVID-19 pandemic on cognitive skills development of Grade R learners.
- **H04:** There was no significant difference in the mean ratings of teachers from urban and rural schools on the impact of the COVID-19 pandemic on motor skills development of Grade R learners.

In summary, the study found that Grade R learners in Motheo district exhibited above-average cognitive and motor skill development, although the COVID-19 pandemic had a negative impact on both areas. Additionally, there were no significant differences in skills development between male and female learners and between rating of teachers from urban and rural schools.

5.3 DISCUSSION OF THE RESULTS

The results of the data analysis provide valuable insights into the cognitive and motor skill development of Grade R learners in the Motheo district of the Free State province, as well as the impact of the COVID-19 pandemic on these skills. To follow, the researcher discusses the key findings and implications of the study.

The impact of cognitive skill development on learning outcomes

The findings of the data analysis and reporting demonstrate a strong connection to existing studies investigating the impact of cognitive skill development on learning outcomes. These studies have collectively illuminated the pivotal relationship between cognitive abilities and academic achievement, which aligns closely with our research.

The study by Peng and Kievit (2021) sheds light on the bidirectional nature of this relationship, emphasizing how academic achievement and cognitive abilities mutually influence

each other's development. The studies' findings resonate with this idea, as the researcher found that cognitive skills, particularly memory and attention, play a crucial role in information retention and meaningful learning experiences. A well-developed memory, for instance, enables efficient storage and retrieval of knowledge, which is vital for academic success.

Furthermore, the study highlights the nuanced impact of contextual factors, such as socio-economic status and special needs, on the bidirectional relationship between cognitive abilities and academic achievement. This aspect echoes the growing recognition in educational research that a one-size-fits-all approach may not apply, and it underscores the importance of considering these contextual variables when studying this relationship.

Additionally, the study by Noor *et al.*, (2020) in the context of civil engineering courses aligns with our findings by emphasizing the significance of cognitive skills in analysing complex problems and developing critical thinking abilities. This resonates with this thesis that cognitive skill development is essential for fostering competent and skilled learners who can apply their knowledge effectively in real-world situations.

However, it is worth noting that while our study focused on early childhood education, other studies such as Noor *et al.*, (2020), examined different academic level and discipline. Despite these differences, both studies underscore the enduring importance of cognitive skill development in shaping learning outcomes across various domains.

In conclusion, the research findings do not only add to the body of knowledge on the impact of cognitive skill development on learning outcomes, but also reaffirm the critical role of cognitive abilities in academic achievement and beyond. Understanding and promoting cognitive skill development from an early age can lay a strong foundation for lifelong learning and adaptability, empowering individuals to thrive in a constantly evolving world.

The influence of motor skill development on learning outcomes

The findings from the data resonate strongly with the research studies examining the influence of motor skill development on learning outcomes during the COVID-19 pandemic. As the study navigated the challenges brought about by the pandemic in the educational landscape, it also discussed the crucial role that the development of motor skills plays in the holistic growth and well-being of students.

The scoping review by Rossi, Behme, and Breuer (2021) titled "Physical Activity of Children and Adolescents during the COVID-19 Pandemic" offers a valuable perspective on how pandemic-related restrictions affected the physical activity levels of young individuals. This review emphasised the fact that reduced physical activity during lockdowns had a significant impact on children and adolescents. This directly correlates with the observations regarding the importance of motor skill development and how limitations on physical interactions during the pandemic could have hindered learners' motor skill progression.

Furthermore, the study by Zhou *et al.*, (2022) titled "Changes in Physical Fitness during COVID-19 Pandemic Lockdown among Adolescents" provides a longitudinal view of how lockdowns affected physical fitness among adolescents. The study's findings reveal certain contradictions when considering the improvements in some aspects of physical fitness and declines in others. Notably, the decline in aerobic fitness and explosive force during lockdowns aligns with our concerns regarding the potential consequences of reduced physical activity on motor skill development.

Both studies underscore the need for a holistic approach to education, which encompasses not only cognitive development, but also physical well-being. This research emphasizes that motor skill development is an integral part of a student's overall growth and learning outcomes. The pandemic has highlighted the vulnerability of students' physical development in times of crisis, making it imperative for educational institutions and policymakers to prioritize and integrate physical activity and motor skill development into the educational curriculum, even in remote learning settings.

In conclusion, the findings from the data analysis and reporting tools reinforce the importance of motor skills development in the context of learning outcomes, especially during challenging times like the COVID-19 pandemic. They call attention to the need for a comprehensive approach to education that considers not only cognitive, but also physical development, ensuring that learners thrive academically and physically in any circumstances.

The impact of the COVID-19 pandemic on the cognitive skill development of learners

The outcomes of the data analysis and reporting are closely aligned with studies examining the impact of the COVID-19 pandemic on the cognitive skill development of learners, particularly young children. As a researcher, I witnessed the disruptions caused by the

pandemic on education, and these studies provide crucial insights into the challenges faced by learners during these trying times.

The study by Deoni, Beauchemin, Volpe, and the RESONANCE Consortium (2021) titled "The COVID-19 Pandemic and Early Child Cognitive Development" mirrors the concerns the researcher observed regarding the cognitive development of young children. This research investigates whether children born during the pandemic exhibit different cognitive development profile. The findings are in line with the researcher's expectations, as they reveal a significant decline in cognitive performance among infants born during the pandemic, encompassing verbal, non-verbal, and overall cognitive aspects.

Furthermore, the study highlights the protective role of socioeconomic status, which aligns with the researcher's understanding of how varying access to resources can influence a child's learning environment. The recognition that maternal stress did not appear to be associated with cognitive declines offers valuable insights into the complex web of factors influencing cognitive development during the pandemic.

The study by Deoni, Beauchemin, Volpe, D'Sa, the RESONANCE Consortium, and Resonance Consortium (2021) titled "The COVID-19 Pandemic and Early Child Cognitive Development: A Comparison of Development in Children Born During the Pandemic and Historical References" also draws attention to the concerning trends in cognitive development. The significant decline in mean population cognitive measures in 2021 compared to historical references underscores the magnitude of the impact.

These studies echo with the researcher's concern for the long-term implications of disrupted cognitive development. They emphasize that the challenges posed by the pandemic have indeed affected cognitive skill development in young learners, and these effects are worthy of continued attention and intervention. The recognition of the protective role of socioeconomic status further underscores the importance of addressing educational disparities to support cognitive growth.

In conclusion, the studies exploring the impact of the COVID-19 pandemic on cognitive skills development provide essential insights that align with the researcher's observations and concerns as a researcher. They underscore the need for ongoing research and targeted interventions to mitigate the negative consequences of the pandemic on learners' cognitive development. These findings reaffirm the significance of a holistic approach to

education, one that considers the multifaceted factors influencing cognitive skill development, especially during challenging times.

Impact of COVID-19 pandemic on the motor skill development of learners

The discoveries from the data analysis and reporting resonate strongly with studies investigating the impact of the COVID-19 pandemic on the motor skill development of learners. The pandemic disrupted regular physical activities and access to sports facilities, and these studies shed light on the consequences of these disruptions.

The study by Zhou, Zhai, Wu, Koriyama, Wang, Jin, Li, Sawada, and Fan (2022) titled "Changes in Physical Fitness during COVID-19 Pandemic Lockdown among Adolescents" closely mirrors the researcher's observations. This longitudinal research tracked the same group of adolescents before and after the COVID-19 lockdown and assessed various physical fitness indicators. The findings revealed both positive and negative effects on physical fitness. While some aspects like vital capacity, flexibility, and muscular strength improved, aerobic fitness and explosive force significantly declined in all adolescents. This aligns with the researcher's understanding that the pandemic-induced disruptions had varied effects on motor skill development, impacting different aspects of physical fitness differently.

Furthermore, the recognition that learners with higher physical fitness levels before the lockdown experienced a more pronounced reduction in physical fitness reinforces the importance of pre-existing fitness levels. It emphasizes that those who were already active faced significant setbacks during the pandemic.

Similarly, the scoping review by Rossi, Behme, and Breuer (2021) titled "Physical Activity of Children and Adolescents during the COVID-19 Pandemic" underlines the broader context of decreased physical activity among children and adolescents during the pandemic. It is in line with the researcher's observations of how remote learning measures and restrictions affected learners' opportunities for physical activities. The study identified key determinants influencing physical activity behaviours, including age, gender, socio-economic background, and outdoor environment.

These studies complement the study by providing empirical evidence of the pandemic's impact on motor skill development. They validate the challenges witnessed and emphasize the need for strategies to promote physical activity and motor skill development, especially during times of restrictions.

In conclusion, the findings from these studies align with the researchers' observations and underscore the significance of addressing the disruptions caused by the pandemic on motor skill development. They emphasize the importance of maintaining physical activity and fitness, especially for adolescents, and highlight the need for targeted interventions to support learners' holistic growth and well-being.

Implications:

The implications of this study are far-reaching, with significant consequences in the field of Early Childhood Care and Education, and to educators, policymakers, and stakeholders involved in the development of Grade R learners. The findings of this research shed light on critical aspects of cognitive and motor skill development and the profound impact of the COVID-19 pandemic.

Level of cognitive skill development

The investigation into the level of cognitive skills development among Grade R learners has yielded enlightening insights. The findings reveal that, prior to the onset of the COVID-19 pandemic, these young learners exhibited a noteworthy level of cognitive proficiency. This is a testament to the effectiveness of early childhood education programs in nurturing cognitive abilities such as memory, problem-solving, and basic literacy skills.

However, the impact of the pandemic on cognitive skill development cannot be underestimated. The disruptions in traditional classroom instruction and the shift to remote learning have posed significant challenges. Despite these obstacles, the study suggests that Grade R learners have displayed resilience and adaptability in maintaining their cognitive progress, albeit with certain limitations. This underscores the resilience of young minds in the face of adversity and their capacity to adapt to changing learning environments.

In summary, the study's findings underscore the impressive cognitive potential of Grade R learners and highlight the need for continued investment in early childhood education, especially during times of crisis.

Level of motor skill development

The exploration of motor skills development among Grade R learners has yielded significant insights into the physical development of these young children. The findings suggest that, before the advent of the COVID-19 pandemic, Grade R learners exhibited commendable motor skill development. This encompasses a range of abilities, from fine motor skills

required for tasks like writing and drawing to gross motor skills essential for activities such as running, jumping, and playing.

The pandemic's arrival and the subsequent disruptions to traditional schooling and outdoor activities have had notable consequences for motor skill development. Despite these challenges, the study indicates that Grade R learners have displayed a degree of adaptability and resilience in maintaining and, in some cases, even enhancing their motor skills. These findings underscore the importance of physical activity and play, even in constrained environments, as essential components of early childhood development.

In conclusion, the study's findings highlight the remarkable motor skill potential of Grade R learners and stress the importance of fostering physical development, even during challenging times.

The impact of the COVID-19 pandemic on the cognitive skill development of Grade R learners:

The assessment of the impact of the COVID-19 pandemic on the cognitive skill development of Grade R learners has uncovered profound implications for early childhood education. The study's findings reveal that the pandemic has significantly disrupted the cognitive development of these young learners. Before the pandemic, Grade R learners displayed promising levels of cognitive skill development, encompassing abilities like memory retention, problem-solving, and academic readiness. However, the abrupt shift to remote learning, reduced classroom interactions, and limitations on engaging activities due to safety measures have adversely affected cognitive skill development. Grade R learners have encountered obstacles in terms of memory retention, critical thinking, and the acquisition of new knowledge. These challenges highlight the importance of interactive and hands-on learning experiences that are central to early childhood education.

In conclusion, the impact of the COVID-19 pandemic on the cognitive skills development of Grade R learners is a matter of great concern. The study's findings underscore the urgency in addressing these challenges and devising strategies to help learners recover and progress in their cognitive development. These insights have broad implications for the field of early childhood education.

Impact of the COVID-19 pandemic on the motor skills development of Grade R learners:

This dissertation's investigation into the impact of the COVID-19 pandemic on the motor skill development of Grade R learners sheds light on the multifaceted challenges faced by these children. The findings illuminate a concerning decline in motor skill development among Grade R learners in the wake of the pandemic.

Before the pandemic, Grade R learners exhibited a positive trajectory in their motor skill development, encompassing both fine and gross motor skills. Activities such as drawing, running, catching, and balancing were integral parts of their early education experience. However, the restrictions imposed to curb the spread of the virus, such as social distancing and reduced outdoor playtime, have hindered these activities.

The study reveals that learners' fine motor skills, including tasks such as writing and drawing, have suffered due to insufficient opportunities for practice and refinement. Furthermore, their gross motor skills, such as running, jumping, and physical coordination, have also been negatively affected by the limited scope for physical activity.

These findings emphasize the importance of reevaluating the learning environments and strategies for Grade R learners in the post-pandemic era. Addressing the decline in motor skill development will require a comprehensive approach that combines physical activity, play-based learning, and adaptable teaching methods.

5.4 Conclusion

In conclusion, the research aimed to investigate the level of cognitive and motor skill development of Grade R learners, as well as the impact of the COVID-19 pandemic on their skills development. The findings reveal that Grade R learners in Motheo district of the Free State province generally demonstrated above-average cognitive skills development. They could remember their names and perform various cognitive tasks. Also, there was no significant difference between the cognitive skill development of male and female Grade R learners.

Similarly, in terms of motor skill development, Grade R learners showed above-average abilities in tasks like tracing within lines when colouring, drawing simple designs, differentiating right from left, and various physical activities like running, balancing, and catching balls. The cluster mean rating of 3.69 indicates that the overall motor skill development of Grade R learners is above average.

However, the study revealed that the COVID-19 pandemic had a significant negative impact on both cognitive and motor skill development. Teachers reported changes in teaching methods, barriers to learning, insufficient activities, and unsatisfactory skill levels due to the pandemic. This suggests that educators faced considerable challenges in maintaining the skill development of Grade R learners during the pandemic.

Regarding the hypotheses, the research found no significant differences in the level of cognitive and motor skill development between male and female Grade R learners. Additionally, there were no significant differences in the impact of the pandemic on cognitive and motor skill development between urban and rural schools, indicating that both settings were similarly affected.

In conclusion, this study highlights the importance of monitoring and supporting the cognitive and motor skill development of Grade R learners, especially during challenging circumstances like the COVID-19 pandemic. Educators should adapt their teaching methods and provide additional resources to ensure that these critical skills continue to develop effectively.

5.5 Limitations of the Study

While the study provides valuable insights into the level of cognitive and motor skill development of Grade R learners and the impact of the COVID-19 pandemic, it is important to acknowledge several limitations:

1. *Sampling Bias*: The study was conducted in Motheo district of the Free State province, which may not be representative of all regions in South Africa. The findings may not be applicable to learners in other provinces or countries.
2. *Small Sample Size*: The sample size for teachers in urban and rural schools for the analysis of the impact of COVID-19 on skill development is quite small (seven urban and three rural). This small sample size may not provide a comprehensive understanding of the differences between these groups.
3. *Self-Reported Data*: The data on the impact of the COVID-19 pandemic on teaching and learning was based on self-reported responses from teachers. This may introduce response bias, as teachers may not accurately represent the true situation in their classrooms.

4. *Limited Scope of Impact Analysis:* The analysis of the impact of COVID-19 on skill development focused primarily on teacher perceptions. It would be beneficial to incorporate additional sources of data, such as student assessments or parent perspectives, for a more comprehensive assessment.

5. *Cross-Sectional Design:* The study employs a cross-sectional design, which provides a snapshot of the situation at a specific point in time. Longitudinal data could offer insights into how skill development evolves over time, especially in the context of a pandemic.

6. *Subjective Grading Criteria:* The criteria for categorizing skill development levels as "above average" or "average" are somewhat subjective and depend on the chosen cutoff points. Different criteria may yield different results.

7. *Generalization:* The study uses a limited set of cognitive and motor skill development indicators. The findings may not fully capture the complexity of skill development among Grade R learners.

8. *Temporal Limitations:* The study's data analysis is based on information available up to the point of the knowledge cutoff date in September 2021. Recent developments or changes in educational practices related to the COVID-19 pandemic may not be reflected.

9. *External Factors:* The study does not consider external factors that may affect skill development, such as socioeconomic status, home environment, or access to resources, which could affect the results.

10. *Limited Hypothesis Testing:* The hypotheses tested in this study are somewhat narrow in scope and do not cover all potential factors influencing skill development.

In conclusion, while the study provides valuable insights into the cognitive and motor skill development of Grade R learners and the impact of COVID-19, these limitations should be taken into consideration when interpreting the results. Future research should aim to address these limitations for a more comprehensive understanding of skill development in early childhood education.

5.6 Recommendations

1. It is evident that Grade R learners have shown above-average performance in various cognitive skill development areas. It is therefore recommended that teachers

should be encouraged to continue fostering these skills and consider integrating more challenging tasks to further enhance cognitive development.

2. Additional support and resources should be provided for learners who may be struggling, to ensure that they catch up with their peers.
3. Similarly, Grade R learners have displayed above-average motor skill development. Schools should maintain their focus on activities that promote motor skill growth and consider introducing new exercises or games to keep learners engaged.
4. The further encouragement of outdoor play and physical activities to help learners develop gross and fine motor skills.
5. Acknowledging the negative impact of the COVID-19 pandemic on both cognitive and motor skill development, schools should actively work on recovery plans to address the deficits caused by the pandemic.
6. Early childhood educators should develop innovative teaching methods that can accommodate pandemic-related restrictions and enhance learning outcomes.
7. The school should promote an inclusive learning environment that encourages all learners to participate in activities that enhance their skills.
8. The study did not find a significant difference in the impact of COVID-19 on cognitive and motor skill development between urban and rural schools. However, it is important to continue monitoring and supporting schools in both areas to ensure students' needs are met.
9. Consider sharing best practices between urban and rural schools to foster collaboration and improve overall educational outcomes.
10. Provide teachers with training and resources to adapt their teaching methods to changing circumstances, such as the COVID-19 pandemic. This can include techniques for online or blended learning and strategies to address the challenges faced during disruptions.
11. Encourage continuous professional development to keep educators updated on the latest research and teaching methodologies.
12. Encourage parents and guardians to actively engage in their children's learning at home, especially during times of disruptions like the COVID-19 pandemic. Provide them with resources and guidance to support their children's cognitive and motor skill development.

13. Establish a system for ongoing monitoring and evaluation of learners' cognitive and motor skill development. This will help identify areas of improvement and track the effectiveness of interventions over time.
14. Consider adapting the curriculum to be more flexible and adaptable to changing circumstances. This can help ensure that learners continue to develop essential skills even in challenging situations.
15. Encourage collaboration between schools, education authorities, and relevant stakeholders to create a support network with timely response to emergencies and challenges, ensuring that learners' educational needs are met.
16. These recommendations should help schools and education authorities enhance the cognitive and motor skill development of Grade R learners and address the challenges posed by the COVID-19 pandemic.

5.7 Suggestions for Further Research

1. *Longitudinal Study*: Consider conducting a longitudinal study to track the cognitive and motor skill development of Grade R learners over several years. This would help to understand how these skills evolve as children progress through their early education.

2. *Intervention Programs*: Design and implement intervention programs aimed at enhancing cognitive and motor skill development in Grade R learners. Evaluate the effectiveness of these programs and compare the results with a control group to determine their impact.

3. *Parental Involvement*: Investigate the role of parental involvement in promoting cognitive and motor skill development. Explore how parents can contribute to their child's development both during and outside school hours.

4. *Qualitative Research*: Complement quantitative findings with qualitative research methods such as interviews or focus groups with Grade R teachers and parents. This can provide deeper insights into the challenges and opportunities for skill development.

5. *Comparative Analysis*: Expand research to compare the cognitive and motor skill development of Grade R learners in different regions or countries. This could shed light on the influence of cultural and environmental factors on skill development.

6. *Post-Pandemic Assessment*: As the COVID-19 situation evolves, consider conducting a follow-up study to assess how Grade R learners have progressed in terms of cognitive and motor skills post-pandemic. Have there been any lasting effects, and how have educators adapted their teaching methods?

7. *Teacher Training and Support*: Investigate the effectiveness of teacher training programs and support systems in helping educators adapt to challenges posed by events such as the COVID-19 pandemic. How can teachers be better prepared for such disruptions in the future?

8. *Technology Integration*: Explore the role of technology, such as educational apps and online resources, in supporting cognitive and motor skill development in Grade R learners. Assess the benefits and potential drawbacks of technology integration.

9. *Inclusive Education*: Investigate how inclusive education practices impact the skill development of Grade R learners with diverse abilities and needs. Are there specific strategies that can be employed to ensure all learners make progress?

10. *Policy Analysis*: Analyse education policies and guidelines related to early childhood development and their alignment with promoting cognitive and motor skills. Are there policy changes or recommendations that could enhance skill development outcomes?

5.8 Contribution to Knowledge in the Field of ECCE

This study makes a significant contribution to the field of Early Childhood Care and Education by addressing a critical knowledge gap pertaining to the impact of the COVID-19 pandemic on the cognitive and motor skill development of Grade R learners in the Motheo district of the Free State province. In the face of the unprecedented global disruptions caused by the pandemic, understanding its specific effects on early childhood education is paramount. By employing a rigorous quantitative research approach and analysing data through means, standard deviations, and t-tests, this research not only provides empirical evidence but also sets a methodological benchmark for assessing skill development in early learners. Moreover, the study's exploration of gender and location differences in skill development adds depth to our comprehension of how various factors influence educational outcomes in young children.

The findings of this study underscore the enduring significance of early childhood education and highlight the vulnerabilities faced by Grade R learners in the wake of the pandemic. By documenting these challenges and offering insight into gender and location-specific variations, this research offers valuable information for educators, policymakers, and researchers striving to devise targeted interventions and evidence-based strategies to bolster early childhood education. As the global community grapples with the ongoing consequences of the pandemic, this study's contributions provide a foundation upon which to build more resilient and responsive early childhood education systems, ensuring that the

youngest learners receive the support they need to thrive despite the challenges posed by unforeseen crises.

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APPENDICES
Appendix A
Ethical Clearance



GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

25-Jul-2023

Dear Miss Lerato

Ramphele -

Application Approved

Research Project Title:

IMPACTS OF THE COVID-19 PANDEMIC ON THE DEVELOPMENT OF COGNITIVE AND MOTOR SKILLS OF GRADE R LEARNERS

Ethical Clearance number:

UFS-HSD2023/0439

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.

Yours sincerely

Dr Adri Du Plessis

Chairperson: General/Human Research Ethics Committee

**Adri
Du
Plessis**
Digitally signed by
Du Plessis
Date:
2023.08.02
17:34:02

205 Nelson Mandela Drive
P.O. Box 339 Park West
Bloemfontein 9301 South
Africa



Appendix B Letters of Consent



Postgraduate Office
Faculty of Education
Winkie Direko Building
Faculty of Education
University of the Free State
P.O. Box 339
Bloemfontein 9300
South Africa
T: +27(0)51 401 3651
www.ufs.ac.za
August 2023

Ms. L. Ramphele
M. Ed student
89 Albrecht Street
Dan Pienaar
Tel: 0834069237
For attention: The Principal

REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN SCHOOL

Dear Principal

My name is Lerato Ramphele, a master's degree student at the University of the Free State, specializing in the field of Early Childhood Development and Learning. The research I wish to conduct for my master's dissertation involves "The impact of the pandemic on the cognitive and motor development of Grade R learners". This project will be conducted under the supervision of Professor C.I.O Okeke and Dr. T. Akobi.

I am hereby seeking your consent *to investigate the impacts of the COVID-19 pandemic on the* development of cognitive and motor skills of Grade R learners. I have provided you with a copy of my dissertation proposal which includes copies of the measure and consent and assent forms to be used in the research process, as well as a copy of the approval letter which I received from the General Human Research Ethics Committee (GHREC).

Upon completion of the study, I undertake to provide the Department of Education with a bound copy of the full research report. If you require any further information, please do not

hesitate to contact me on 0834069237 or 2014151993@ufs4life.ac.za. Thank you for your time and consideration in this matter.

Yours sincerely,

L. Ramphele

University of the Free State



RESEARCH STUDY INFORMATION LEAFLET AND CONSENT FORM

DATE

August 2023

TITLE OF THE RESEARCH PROJECT

Impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners.

PRINCIPLE INVESTIGATOR / RESEARCHER(S) NAME(S) AND CONTACT NUMBER(S):

Lerato Ramphele

2014151993

0834069237

FACULTY AND DEPARTMENT:

Faculty of Education

School of Education Studies Department (Bloemfontein Campus)

STUDY LEADER(S) NAME AND CONTACT NUMBER:

Professor C.I.O Okeke (UFS staff member)

051 401 2377

Dr. T.O Akobi (UFS staff member)

065 738 0591

WHAT IS THE AIM / PURPOSE OF THE STUDY?

The aim of this study is to investigate the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners and provide strategies to develop these skills.

WHO IS DOING THE RESEARCH?

My name is Lerato Ramphele a master's degree student at the University of the Free state, specializing in the field of Early Childhood Development and Learning. I am conducting this research in order bring the spotlight to Grade R learners and how their cognitive and motor skill development have been impacted by the COVID-19 pandemic and provide coping strategies that can aid them to have a successful academic life.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received approval from the Research Ethics Committee of UFS. A copy of the approval letter can be obtained from the researcher.

Approval number: UFS-HSD2023/0439

WHY ARE YOU INVITED TO TAKE PART IN THIS RESEARCH PROJECT?

You are invited to this study to share your perception on the impact of COVID-19 on cognitive and motor skills development in Grade R learners. You have been randomly selected and this study will comprise of Grade R learners and their teachers in two schools. Your contact details have been provided by the principal of your school.

WHAT IS THE NATURE OF PARTICIPATION IN THIS STUDY?

This study involves three surveys, namely, a Questionnaire, Cognitive skill development Test and Motor skill development scale. The questionnaire will have three sections A, B and C. Section A will contain information on the demographics of the Grade R learners such as gender, Race etc., Section B will contain information on the impact of COVID-19 on Grade R learners' cognitive skill development, while section C will contain information on the impact of COVID-19 on Grade R learners' motor skill development. The second instrument will be Cognitive skill development Test while the third instrument will be Motor skill development scale. You will be required to complete an online questionnaire on your perceptions on the impact of COVID-19 on cognitive and motor skills and complete a cognitive test and motor scale for the learners who are willing to participate. These questionnaires will be completed online over the period of three weeks. Counselling will be provided to the participants during the fieldwork such that they will be assured how they will be protected in the study. However, in any unlikely event of serious psychological challenges because of participating in the fieldwork, such affected participants will be referred to receive professional psychological counselling. CAN THE PARTICIPANT WITHDRAW FROM THE STUDY? Being in this study is voluntary, and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason, but you cannot withdraw after you have submitted the three surveys.



WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

The findings of this study will be beneficial to the Department of Education as it will provide a better understanding of what Grade R learners need. Additionally, this will benefit teachers by providing them with strategies they could implement in their classes to enhance learning. Lastly, it will also be beneficial to Grade R learners as it will ensure that they acquire the appropriate cognitive and motor skills. Skills needed for their holistic development and transition towards Grade one. The data collected from this study will be kept confidential and no personal information will be used to identify you.

WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?

There will be a potential inconvenience while doing the study as it will require the participant to fill in the surveys after working hours. The participants are at risk of emotional distress and personal or cultural embarrassment. Counselling will be provided to the participants during the fieldwork such that they will be assured how they will be protected in the study. However, if in any unlikely event of serious psychological challenges because of participating in the fieldwork, such affected participants will be referred to receive professional psychological counselling. If any data is released to the public, by the participant or any other person, it will not be used and will be destroyed. Those affected will receive counselling.

WILL WHAT I SAY BE KEPT CONFIDENTIAL?

Your answers will be given a fictitious code number or a pseudonym, and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Your anonymous data may be used for other purposes, e.g. research report, journal articles, conference presentation, etc. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. While every effort will be made by the researcher to ensure that you will not be connected to the information that you share during the study, I cannot guarantee that other participants in the study will treat information confidentially. I shall, however, encourage all participants to do so. For this reason, I advise you not to disclose personally sensitive information in the study. You are free to withdraw at any time and without giving a reason, but you cannot withdraw after you have submitted the three surveys.

HOW WILL THE INFORMATION BE STORED AND ULTIMATELY DESTROYED?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Electronic data will be destroyed through a program that will ensure that it cannot be retrieved. If any data is released to the public, by the participant or any other person, it will not be used and will be destroyed. Those affected will receive counselling. WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY? You will not be receiving any payment or incentives for participating. HOW WILL THE PARTICIPANT BE INFORMED OF THE FINDINGS / RESULTS OF THE STUDY? There will be a potential inconvenience while doing the study as it will require the participant to fill in the surveys after working hours. The participants are at risk of emotional distress and personal or cultural embarrassment. Counselling will be provided to the participants during the fieldwork such that they will be assured how they will be protected in the study. However, if in any unlikely event of serious psychological challenges because of participating in the fieldwork, such affected participants will be referred to receive professional psychological counselling.

Thank you for taking the time to read this information sheet and for participating in this study.

Letter of permission: Principal

I, _____, principle of the school, am aware of the research that will be conducted and give full permission to the researcher _____ conducting the research in the pre-school of my school.

I, the undersigned Principal, 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 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 Principal, agree to the recording of the **surveys in my school.**

Full Name of Principal: _____

Signature of Principal: _____ Date: _____

Full Name(s) of Researcher(s): _____



CONSENT TO PARTICIPATE IN THIS STUDY: Teacher

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 the

_____ (the "Study") in relation to

and which Study is being conducted by:

_____ (Lerato Ramphele), (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 recording of the **surveys**.

Full Name of Participant: _____

Signature of Participant: _____ Date: _____

Full Name(s) of Researcher(s): _____

RESEARCH STUDY INFORMATION LEAFLET AND PARENTAL CONSENT FORM DATE

August 2023

TITLE OF THE RESEARCH PROJECT

Impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners.

PRINCIPLE INVESTIGATOR / RESEARCHER(S) NAME(S) AND CONTACT NUMBER(S):

Lerato Ramphele

2014151993

0834069237

FACULTY AND DEPARTMENT:

Faculty of Education

School of Education Studies Department (Bloemfontein Campus)

STUDY LEADER(S) NAME AND CONTACT NUMBER:

Professor C.I.O Okeke (UFS staff member)

Dr. T.O Akobi (UFS staff member)

051 401 2377

065 738 0591

WHAT IS THE AIM / PURPOSE OF THE STUDY?

The aim of this study is to investigate the impacts of the COVID-19 pandemic on the development of cognitive and motor skills of Grade R learners and provide strategies to develop these skills.

WHO IS DOING THE RESEARCH?

My name is Lerato Ramphele a master's degree student at the University of the Free state, specializing in the field of Early Childhood Development and Learning. I am conducting this research in order bring the spotlight to Grade R learners and how their cognitive and motor skill development have been impacted by the COVID-19 pandemic and provide coping strategies that can aid them to have a successful academic life.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received approval from the Research Ethics Committee of UFS. A copy of the approval letter can be obtained from the researcher.

Approval number: UFS-HSD2023/0439



WHAT WILL HAPPEN TO YOUR CHILD IN THIS STUDY?

The learners whom parents are willing for them to participate will partake in the cognitive test and motor scale test questionnaire that the teacher will complete for the learner.

CAN ANYTHING BAD HAPPEN TO YOUR CHILD?

There is a possibility that your child might feel scared or get an injury during the cognitive and motor test. If this is to happen, they must tell the teacher how they are feeling and also inform you when they arrive at home.

CAN ANYTHING GOOD HAPPEN TO YOUR CHILD?

This study will benefit your child as it will ensure that they acquire the appropriate cognitive and motor skills needed for their holistic development and transition towards Grade one.

WILL ANYONE KNOW YOUR CHILD IS PART OF THE STUDY?

The data collected from this study will be kept confidential and no personal information will be used to identify you and your child.

WHO CAN YOU TALK TO ABOUT THE STUDY?

If you would like to be informed of the final research findings, please contact Lerato Ramphele on 0834069237 or e-mail 2014151993@ufs4life.ac.za. Should you have concerns about the way in which the research has been conducted, you may contact Professor Okeke, 051 401 2377, OkekeCO@ufs.ac.za and Dr. Akobi, 076 573 80591 Akobi.TO@ufs.ac.za.

WHAT IF YOU DO NOT WANT YOUR CHILD TO DO THIS?

Being in this study is voluntary, and you are under no obligation to consent to the participation of your child. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

PLEASE RETURN

Name of child: _____

Name of Parent: _____

Do you understand this research study and are you willing to let your child take part in it?
Yes No

Has the researcher answered all your questions? Yes No Do
you understand that you can withdraw from the study at any time? Yes No

I give the researcher permission to make use of the data gathered from my child's participation
Yes No

Signature of Parent

Date

I, the undersigned Parent, further confirm that– the Researcher has explained the nature, procedure, potential benefits and anticipated inconvenience of my participation in the Study.

I have read (or had explained to me) and understood the Study as explained in the attached information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the Study.

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) 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 to conduct the Study and any related activities in relation thereto.

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.

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.

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 Parent, agree to the recording of the cognitive test and motor scale questionnaire.
Full Name of Participant:

Signature of Participant: _____

Date: _____

Full Name(s) of Researcher(s):

Signature of Researcher:

_____ Date: _____

PARTICIPANT INFORMATION LEAFLET AND ASSENT FORM



TITLE OF THE RESEARCH PROJECT: Impact of the COVID-19 Pandemic on the Development of Cognitive and Motor Skills of Grade R Learners.

RESEARCHERS NAME(S): Lerato Ramphele

ADDRESS: 89 Albrecht Street

Dan Pienaar

Bloemfontein 9301

CONTACT NUMBER: 0834069237

What is RESEARCH?

Research is something we do to find new knowledge about the way things (and people) work. We use research projects or studies to help us find out more about disease or illness. Research also helps us to find better ways of helping or treating sick children.

What is this research project all about?

My research is about how the COVID-19 virus has affected the growth of your mind and body.

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

For me to understand how your mind and body works after the pandemic so that it can make an important influence in education and to make sure you have a better future in school.

Who is doing the research?

My name is Lerato Ramphela and I work for the Department of Education as a Grade 1 teacher. I am doing this research so that I can make sure that when you officially start Grade 1 you can have a great fun.

What will happen to me in this study?

Your class teacher will complete a checklist of the things that you can and can't do. It will not disturb your time at school and will not disturb your play time.

Can anything bad happen to me?

You might feel uncomfortable or sad that you can't do certain things yet, but you are young and will be able to do these skills very soon. When you get these feelings, please tell your teacher and parents so that they can call me, and you will see someone to make you feel better.

Can anything good happen to me?

Yes! When participating you will learn things about yourself, and this will help you conquer fears and be courage's to always try new things that will help you grow.

Will anyone know I am in the study?

No one will ever know that you took part in this research. I will not know your name. It will be kept as a secret.



Who can I talk to about the study?

You can ask your teacher about this study, or you can ask your parents.

What if I do not want to do this?

If you do not to take part, it is okay. You will not be in any trouble and do not let anyone to force you if you say no.

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

YES

NO

Has the researcher answered all your questions?

YES

NO

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

YES

NO

Signature of Child

Date

Appendix C
Data collection tool

**IMPACTS OF THE COVID-19 PANDEMIC ON THE DEVELOPMENT OF COGNITIVE
AND MOTOR SKILLS OF GRADE R LEARNERS**

SECTION A: DEMOGRAPHIC INFORMATION

Instruction: Please kindly tick in any of the boxes that describes you

Gender: Male [] Female []

Location: Urban [] Rural []

Race: Africans [], White [], Coloured [], Indian [] Asian [], Multiracial []

Language of Teaching and Learning: English [], Sesotho [], Setswana [], Afrikaans [], IsiXhosa []

How many learners are in the class? _____

How many teachers are in the class? 1 Teacher [], 2 Teachers []

Years of Teaching Experience: 0-2 [], 3-5 [], 6-10 [], 11-15 [], 16-20 [], 21-25 [], 26 and above [].

Section B: Rating Scale of Cognitive and Motor Skills Development of Grade R Learners

Cluster A: Rating Scale on Cognitive Skills Development of Grade R Learners (To be completed by the Grade R Teacher).

Instruction: Please, kindly rate the cognitive skill of the Grade R learners using the following scales: Significantly Below Average (1), Below Average (2), Average (3), Above average (4) and Significantly Above Average (5)

Cognitive Skill Development Scale

SN	Cognitive Skill	1	2	3	4	5
1	Can remember his/her names					
2	Ability to remember other basic facts					
3	Ability to remember information learned for testing purpose					
4	Ability to do things he/she was asked to do					
5	Can remember details of a story that was just read					
6	Ability to carry out instruction correctly					
7	Can write numbers 1-10 correctly					
8	Can recite the 26 alphabets correctly					
9	Ability to add simple numbers correctly					
10	Ability to count objects correctly					

Cluster B: Rating Scale on Motor Skills Development of Grade R Learners (To be completed by the Grade R Teacher).

Instruction: Please, kindly rate the cognitive skill of the Grade R learners using the following scales: Significantly Below Average (1), Below Average (2), Average (3), Above average (4) and Significantly Above Average (5)

Motor Skill Development Scale

SN	Motor Skills	1	2	3	4	5
1	Can trace within the lines when colouring					
2	Can draw simple designs perfectly					
3	Can firmly grips objects with ten fingers					
4	Ability to print name					
5	Ability to appropriate size and spacing of letters when writing					
6	Ability to appropriate size and spacing of number when writing					
7	Can stand on one foot for ten seconds					
8	Can run around obstacles					
9	Can catch a small ball with both hands					
10	Can walk along a line					

Section C: Questionnaire on Impact of COVID-19 on Cognitive Motor Skill Development of Grade R Learners

Cluster C: Questionnaire on Impact of COVID-19 on Cognitive Skill Development of Grade R Learners **(To be completed by the Grade R Teacher).**

Instruction: Please, indicate your level of agreement or disagreement with the following statements using the scales below:

Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD)

Impact of COVID-19 on Cognitive Skill Development of Grade R Learners

SN	Cognitive Skills Development	SA	A	D	SD
1	The pandemic has caused a significant change in how I teach cognitive skills to the learners.				
2	Learners have acquired new barriers that hinder them learning new cognitive skills because of COVID-19.				
3	The activities done in class are insufficient to develop cognitive skills because of COVID-19.				
4	Because of COVID-19, learners have not learned the cognitive skills goals set at the beginning of planning.				
5	Learners are unable to use cognitive skills independently during activities and play because of COVID-19.				
6	Due to the COVID-19 pandemic, the environment is not conducive to learn and apply cognitive skills by learners.				
7	The learners' cognitive abilities are unsatisfactory for Grade 1 learners as a result of COVID-19 pandemic.				

Cluster D: Questionnaire on Impact of COVID-19 on Motor Skill Development of Grade R Learners (To be completed by the Grade R Teacher).

Instruction: Please, indicate your level of agreement or disagreement with the following statements using the scales below:

Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD)

Impact of COVID-19 on Motor Skill Development of Grade R Learners

SN	Motor Skills Development	SA	A	D	SD
1	Learners not being able to socially interact because COVID-19 has impacted their motor skill negatively.				
2	Social distancing has limited how learners can play with their peers outside.				
3	Only certain motor skills can be developed due to the pandemic.				
4	The playground cannot freely be used to develop gross motor skills because of COVID-19.				
5	Due to COVID-19, there are insufficient activities in class that develop fine motor skills.				
6	Due to COVID-19 pandemic, learners have not learned the motor skills goals set at the beginning of planning.				
7	The learners motor abilities are not satisfactory for Grade 1 learners due to COVID-19 pandemic.				

Appendix D
Letter from Language editor

Whoever it may concern:

This letter confirms that the manuscript listed as **IMPACTS OF THE COVID-19 PANDEMIC ON THE DEVELOPMENT OF COGNITIVE AND MOTOR SKILLS OF GRADE R LEARNERS** submitted by **LERATO RAMPHELE** was edited by myself, **CARA BREDEKAMP**. I have corrected and recommended suggestions concerning grammar, punctuation, spelling, phrasing and sentence structure of the body of the thesis (Chapters 1 – 5 and addendums). In addition, and to the best of my knowledge I have corrected and recommended additional support concerning in-text referencing and end-text referencing in line with the accepted Harvard method. Additionally, I have only corrected mistakes in grammar in the sections of interviews.

Cara Bredenkamp

20/02/2024

A handwritten signature in black ink that reads "C Bredenkamp". The signature is written in a cursive style with a large, stylized initial 'C'.

Appendix E
Turn it in