The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

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Dissertation accepted in fulfilment of the requirements for the degree *Master of Education in Physical Education* at the North-West University

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Graduation ceremony: October 2020

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DECLARATION

I, Simoné van Zyl, declare the this study titled: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa, is my own work.

This dissertation for the *Magister Educationis* in Physical Education degree is submitted to the Faculty of Education, North-West University, and has not been submitted by me or any other person for a degree at any alternative institution.

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Date: 13 March 2020

Acknowledgements

After the successful completion of this study I would like to give recognition to a few people, without whose support, motivation and advice I would not have been able to complete this study, viz.:

- My Father in heaven who gave me the strength and perseverance to finish what I started.
- The North-West University that made it possible for me by providing a bursary for that purpose.
- Professor Dorita du Toit of the Subject Group Movement Education, at the Faculty of Education, North-West University, who acted as my supervisor.
- Doctor Niekie van der Merwe of the Department of Movement Education, Faculty of Education, North-West University, who acted as my co-supervisor.
- Ms. E van Wyk, my language editor, who was always willing to help me with the editing of my study.
- Casper (uncle) and Martie (aunt) Maree for your continuous encouragement and the fact that you always believed in me.
- My parents, Johan and Amanda van Zyl, for your love and support; I appreciate all your sustained love and support.

Abstract

Research shows that motor development is essential and fundamental for a child's physical, emotional, social and cognitive development from an early age. The development of perceptual-motor skills adds to the improvement of school readiness skills, which include reading, listening, writing and language skills. According to the Curriculum and Assessment Policy Statement (CAPS), the focus in Physical Education (PE) in the Foundation Phase should be on physical growth and learners' physical development, contributing to a healthy and active lifestyle, but the most important goal is to develop motor skills. Ensuring optimised motor development programmes should be purposefully planned and organised. However, schools in lower socio-economic areas often find it difficult to present developmentally-appropriate PE programmes due to a lack of trained PE teachers, facilities and resources.

In light of the above, the main aim of this study was the effect of a PE programme presented by a specialist PE teacher, on the perceptual motor skills of selected Grade 1 learners. The objectives of the study were as follow: Firstly, to determine the effects of a PE programme on the perceptual motor skills of Grade 1 learners; and secondly, to determine the levels of perceptual motor skills of Grade1 learners, in comparison to that of the age norms, before the intervention.

The study was based on quantitative research within the theoretical perspective of the positivistic approach, which is a research philosophy known for its objectivity based on independent variables. The quantitative data collection included conducting standardised perceptual-motor tests before and after the ten-week-long intervention programme. A convenience sample (N=103) was selected from the participating school in a lower socio-economic area and divided into an experimental-(n=78) and a control group (n =25). The weekly PE lessons consisted of a warm-up, a variety of fundamental movement and perceptual-motor skills, and a cool-down activity including a game. Improvised apparatus were made from scrap materials and used in the PE programme. The data analysis included descriptive statistics and inferential statistics including t-tests and ANCOVA. After the second round of perceptual-motor tests had been conducted, the PE programme was presented to the control group.

The results of the pre-test showed that the perceptual-motor skills of both the experimental and control groups were below average compared to their age norms. After the intervention, the experimental group's balance walk forward and backwards, ball catching, ball kicking and hopping skills showed statistical and practical significance while the control group's perceptual motor skills did not improve. It can be concluded that the 10-week PE programme had a positive effect on the perceptual-motor skills of the Grade 1 learners. It is, therefore, recommended that scientific, developmentally appropriate PE programmes should be presented by trained PE teachers, to improve the perceptual-motor skills of young learners. PE programmes can make a positive contribution to the academic, social, psychological and physical development of Grade 1 learners in South African schools in lower socio economic areas.

Key words: Physical Education, perceptual-motor skills, intervention, Grade 1, lower socio economic school.

Opsomming

Navorsing toon dat motoriese ontwikkeling noodsaaklik en fundamenteel is vir kinders se fisieke, emosionele, sosiale en kognitiewe ontwikkeling vanaf ‘n vroeë ouderdom. Die ontwikkeling van perseptueel-motoriese vaardighede dra by tot verbetering? van skoolgereedheid, wat lees-, luister-, skryf- en taalvaardighede insluit. Volgens die Kurrikulum- en Assesseringsbeleidverklaring (KABV) moet die fokus in Liggaamlike Opvoeding in die Grondslagfase op fisieke groei en leerders se fisieke ontwikkeling wees sodat dit kan bydra tot ‘n gesonde en aktiewe leefstyl, maar die belangrikste is die ontwikkeling van motoriese vaardighede. Om te verseker dat motoriese ontwikkelingsprogramme suksesvol aangebied word, moet dit doelgerig en georganiseerd beplan word. Skole in lae sosio-ekonomiese gebiede vind dit dikwels moeilik om ontwikkelingstoepaslike Liggaamlike Opvoedingsprogramme aan te bied as gevolg van ‘n tekort aan opgeleide Liggaamlike Opvoeding-onderwysers, fasiliteite en hulpbronne.

In die lig van bogenoemde, was die doel van hierdie studie om die effek te bepaal van ‘n Liggaamlike Opvoedingsprogram, aangebied deur ‘n spesialis Liggaamlike Opvoeding-onderwyser, op die perseptueel-motoriese vaardighede van ‘n groep Grondslagfase-leerders (spesifiek Graad 1-leerders). Die volgende doelwitte is gestel om die studie te fokus: eerstens, om die effek van ‘n Liggaamlike Opvoedingsprogram op die perseptueel-motoriese vaardighede van Graad 1-leerders te bepaal; en, as ‘n sekondêre doelwit, om die vlakke van Graad 1-leerders se perseptueel-motoriese vaardighede, in vergelyking met die van ouderdomsnorme, voor die aanvang van die Liggaamlike Opvoedingsprogram te bepaal.

Die studie was gebaseer op kwantitatiewe navorsing binne die teoretiese perspektief van die positivistiese benadering, ‘n navorsingsfilosofie wat bekend is vir objektiwiteit gebaseer op onafhanklike veranderlikes. Die kwantitatiewe data-insameling het die uitvoering van gestandaardiseerde perseptueel-motoriese toetse voor en na die 10-weeklange Liggaamlike Opvoedingsprogram behels. ‘n Gerieflikheidsteekproef vanuit ‘n skool uit ‘n lae sosio-ekonomiese area is gebruik, bestaande uit ‘n groep van 103 Graad 1’s, waarvan die eksperimentele groep 78 en die kontrolegroep 25 deelnemers was. Die weeklikse Liggaamlike Opvoedinglesse het bestaan uit ‘n opwarming, ‘n hooffase met ’n verskeidenheid

fundamentele bewegings- en perseptueel-motoriese vaardighede, en ‘n afkoel-aktiwiteit wat ‘n speletjie ingesluit het. Geïmproviseerde apparate is uit afvalmateriaal gemaak en gebruik gedurende die Liggaamlike Opvoedingsprogram. Die data-analise het beskrywende statistiek en inferensiële statistiek, insluitende t-toetse en ANCOVA, behels. Nadat die tweede rondte se toetse gedoen is, is die Liggaamlike Opvoedingsprogram ook aan die kontrolegroep gebied, sodat hulle nie benadeel sou word omdat hulle in die kontrolegroep was nie.

Die resultate toon dat, voor die aanvang van die Liggaamlike Opvoedingsprogram, beide die eksperimentele - en kontrolegroepe se perseptueel-motoriese vaardighede, veral die balans loop vorentoe, die balans loop agteruit, die huppel-, balvang-, balskop- en die vinger-na-neusvaardighede ondergemiddeld ten opsigte van ouderdomsnorme was. Na afloop van die Liggaamlike Opvoedingsprogram het die eksperimentele groep se balans loop vorentoe en agteruit, balvang-, balskop- en eenbeenspring vaardighede verbeterings van statistiese en praktiese betekenisvolheid getoon, terwyl die kontrolegroep nie verbeter het nie. Die gevolgtrekking is gemaak dat die 10-weeklange Liggaamlike Opvoedingsprogram ‘n positiewe effek op die perseptueel-motoriese vaardighede van Graad 1-leerders gehad het, veral met betrekking tot spesifieke koördinasie en balans vaardighede. Dit word daarom aanbeveel dat wetenskaplike, ontwikkelingstoepaslike Liggaamlike Opvoedingsprogramme deur opgeleide Liggaamlike Opvoeding-onderwysers aangebied word, ten einde die perseptueel-motoriese vaardighede van jong leerders te verbeter. Diesulke Liggaamlike Opvoedingsprogramme kan ‘n positiewe bydrae maak tot die akademiese, psigologiese en fisieke ontwikkeling van leerders in skole in Suid-Afrika.

Sleutelwoorde: Liggaamlike Opvoeding, perseptueel-motoriese vaardighede, intervensie, Graad 1, landelike skole.

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CHAPTER 1:
Introduction, literature review and problem statement

1.1 Introduction

Motor development is important for and forms the foundation of a child's physical, social, personal, cognitive and emotional development (Fontaine *et al*., 2006:99). According to Donnelly *et al.* (2017:80), perceptual and motor development is interrelated as all movement involves perceptual awareness which originates from sensory stimulation, while movement influences perceptual skills. Proper, planned perceptual-motor development contributes to school readiness skills which involve reading, listening, writing and language skills (Gabbard, 2008:52). Fredrick's, Kokot and Krog (2006:29) state that movement development is essential to learning, and, according to Donnelly *et al*. (2017:147) it is also related to perceptual-motor processes. Implementation of a movement programme within Physical Education (PE) in the school, however, must be purposefully organised to ensure optimal gross motor skills development (Fredericks *et al*., 2006:29). Furthermore, schools in rural areas often face challenges, such as a lack of trained teachers and facilities, in implementing quality movement programmes (Du Toit *et al*., 2007:249, Stroebel, 2016:225). This study, therefore, focused on the effect of a Physical Education programme presented by a specialist Physical Education teacher, on the motor skills, especially perceptual-motor skills, of a group of Foundation Phase learners in South Africa.

1. 2 Clarification of terminology

In order to understand some general terms used in this study, the following are explained in detail:

1.2.1 Fundamental movement skills

Fundamental movement skills are classified as the building blocks for more complex movements required for sport-specific and recreational activities (Lubans *et al.*, 2010:40). Fundamental movement skills are basic movement skills performed in a sequence and combining the use of more than one body part (Donnelly *et al.*, 2017:120). Fundamental movements consist of locomotor (movement in a direction), manipulative (skills where an object is manipulated, including gross motor or fine motor

skills, e.g. ball skills), and stability (postural balance) (Donnelly *et al*., 2017:42; Gallahue & Ozman, 2006:45). Fundamental movement skills form the foundation for progression to sport-specific skills (Okely & Booth, 2004:358). It is therefore important to develop these skills in early childhood, in order to develop certain movement patterns as a foundation for more complex movement patterns (Hardy *et al.*, 2010:503). Fundamental movement skills can include gross motor, perceptual-motor and fine motor skills.

1.2.2 Gross motor skills

Gross motor skills are movement skills where mainly large muscle groups are being used and controlled in a movement (Gallahue & Donnelly, 2003:258; Payne & Isaacs, 2008:20). Gross motor skills go mainly through three stages of movement development, namely the initial, elementary and mature stages of movement patterns (De Jager, 2009:51). These gross motor skills are the origin of muscle development and movement (Stampfer *et al.*, 2000:16) and are also regarded as fundamental movement skills (Gallahue & Donnelly, 2003:259).

1.2.3 Perceptual-motor skills

Perceptual- motor skills consist of all movements that involve an element of perceptual awareness resulting from sensory stimulation and where perceptual skills are influenced in part by movement (Gallahue & Ozman, 2006:54). According to Westendorp *et al*. (2011:2773) and Payne and Isaacs (2012:72), perceptual-motor development contributes to school readiness skills like listening skills, reading skills, writing and language skills, and self-confidence. Perceptual-motor skills include basic skills/movements or abilities which are important for building a movement foundation, for the completion of more complex learning processes (Payne & Isaacs, 2012:73).

1.2.4 Motor development

Motor development is the progressive change in motor control and motor behaviour through the interaction of maturation and experience, as evidenced throughout life by observable movement (Donnelly *et al*., 2017:21). Motor development also involves the development, during maturation, in specific tasks, biological composition of a person's life and the demands of the environment.

1. 3. Literature review and problem statement

1. 3.1 Introduction

These days, children are allowed considerably less time for any physical activity during a normal school day (Hardy *et al.,* 2012:390; Pienaar & Kemp, 2014:167; Stroebel *et al*., 2016:215). Children learn by exploring the environment through movement (Clark, 2007:39), but unfortunately, many teachers and parents do not consider movement as important (Hands, 2012:14). According to Piek *et al*. (2008:668) and Pienaar and Kemp (2014:167), movement and physical activity contribute to a child's quality of life, and enhance intellectual development, academic achievement and overall health. For children to achieve optimal development, motor development is a necessity and forms the foundation for a child's physical, social, personal, cognitive and emotional development, approaches to learning as well as communication skills (Fontaine *et al*., 2006:99). The following entails a more in-depth discussion on the value of well-developed perceptual-motor skills, challenges for learners in lower socio economic areas in South Africa, and other studies on the effects of motor intervention programmes in other countries as well as in South Africa.

1.3.2 The value of well-developed perceptual-motor skills

Movement is vital for the development of children's physical, cognitive and social characteristics (Cools *et al*., 2009:154; Goodway & Robinson, 2015:267). Complications with the acquisition and performance of motor skills experienced by children may thus have an effect on the development of academic performance, cognitive, social, physical, emotional and sport development (Hands, 2012:15). The relationship between perceptual-motor skills and cognitive development, academic performance, social and emotional development, physical development and sport development, will be discussed hereafter.

1.3.2.1 Physical development

The development of fundamental movement skills are the building blocks for advanced movement and the development of physical literacy (Donnelly *et al*., 2017:13). In addition to learning the alphabet and phonics to read, or to identify numbers and mastering adding and subtraction for all, the development of fundamental motor skills is critical for children to apply in sport activities (Fredericks *et al*., 2006:29; Lloyd *et al.*, 2016: 1495; Lloyd *et al.*, 2014: 68; Van Beurden *et al*., 2002:244). It has been demonstrated that without the optimal development of fundamental movement skills, children may experience delays in motor skills (Hands, 2012:14) which lead to behaviours of solitary functional play and poor motor planning (Robinson *et al*., 2009:543; Goodway & Robinson, 2015:268), and which can also compromise health-related fitness (Burns *et al.,* 2015:284). According to Hands (2012:14), children with poor coordination or inefficient fundamental movement skills may develop a condition known as Developmental Coordination Disorder. These children lack in performing most skills that are at the appropriate level for their age.

Fundamental movement skills develop through a continuum of stages, from the initial to the elementary through to the mature stage (Donnelly *et al*., 2017:34; Haywood *et al.*, 2012: 26). Early childhood is the optimum development period for fundamental movement skills, as the critical developmental period for perceptual motor-skills is considered to be between three to seven years of age (Donnelly *et al*., 2017:34; Gallahue & Ozmun, 2006: 22). Furthermore, movement and physical activity play an important role in and are necessary for all growth and change (Donnelly *et al*., 2017:23).

Another aspect of physical development which can be influenced by the poor development of perceptual-motor skills is overweight and obesity. Learners are becoming less active, and therefore sedentary lifestyles increase and this leads to higher obesity rates (Kelly *et al.,* 2004:324; Reilly *et al.,* 2004:211). It is also reported that obesity rates worldwide, are high compared to normal weight rates amongst the youth (Janssen *et al.,* 2005:123). According to the World Health Organization (WHO, 2017), more than 41 million learners under the age of five worldwide were overweight or obese in 2017.

Learners with poor levels of perceptual-motor skill development often struggle with poor muscle development and flexibility, which leads to decreased participation in physical activity (Hands, 2012:11). Improving their perceptual-motor skills will

therefore contribute to integrating physical activity in learners' lives, which will allow them to maintain a healthy, active lifestyle (Tucker, 2008:547). Also, for the specific reason of the development of gross motor skills, which decreases adiposity and increases cardio-respiratory fitness which also includes various other health benefits, learners must participate more in physical activities (Okely *et al*., 2004:238). Studies also show that overweight learners tend to be less skilled in fundamental movement skills than learners who have a healthy weight (Logan *et al*., 2012:205).

It is for reasons such as those stated above, that Lloyed *et al*. (2014:67) emphasise the importance of implementing a Physical Education programme that allows learners to develop fundamental movement skills early in life. Developing perceptual-motor skills is also the key to cognitive development and academic achievement, which will be investigated next.

1.3.2.2 Cognitive development and academic performance

Development in early childhood years is ideal for creating opportunities for children to develop control of their muscles and movement, which is associated with the forming of new neural pathways (Donnelly *et al.*, 2017:24). It is also argued (Leppo *et al*., 2000:142; Pienaar & Kemp, 2014:168) that without proper stimulation during infancy, pathways of the brain may not develop in the correct manner and motor skills may stay underdeveloped. Furthermore, physical activity causes brain function to be enhanced at a fundamental level (Ratey & Hagerman, 2008:5). According to Hannaford (2005:15) and Haapala (2013:65), physical activity, which includes the practice of perceptual-motor and gross-motor skills, promotes neural growth and therefore the whole body plays a role in intellectual processes. Movement provides stimulation to neurological systems which are necessary for the child's development and optimal functioning; thus, repetition of movement adds and creates more established pathways in the brain (Hannaford, 2005:111). Movement that includes various senses, awareness and coordination activities, also leads to an increase of cognitive functioning (Fredericks *et al*., 2006; Hannaford, 2005:37). Kleim (2011:74) concludes that physical activity which promotes the development of perceptual-motor skills, can enhance academic performance and also lead to increased cerebral blood flow, modification in arousal level, changing hormone secretion and improving self-

esteem. These activities improve certain areas in academic performance, specifically in reading and mathematics (Grissom, 2005:11).

It has been found in several studies that fundamental movement skills are linked to a child's academic performance (Haapala, 2013:65; Katic & Bala, 2012:75; Nourbakhsh, 2006:44). According to literature, the academic outcomes of children improved when they participated in sport programmes (Coe *et al*., 2006:1515; Sibley, & Etnier, 2003:243; Tomporowski, 2003:348). A positive relationship has further been found between perceptual-motor skills and academic learning in a study among 400, 11-year-old children in Iran (Nourbakhsh, 2006:44). Fredericks *et al*. (2006:30) confirmed improved reading and mathematical skills after implementing perceptual-motor skills in an intervention programme among Grade 1 learners in South Africa. Research also connects poor coordination, attention deficit, low self-esteem and low self-worth with poor academic performance (Piek *et al*., 2000:265). Another aspect of development that is affected by perceptual-motor development is the social and emotional development of the learner.

1.3.2.3 Social and emotional development

Research shows that participating in a motor development programme can improve learners' social skills and emotional well-being (Cairney *et al*., 2013:224). It has also been found that learners with low levels of motor competency struggle, not just in physical development, but also in the social domain such as having fewer classmates, and peer exclusion (Livesey *et al*., 2011:581). Evidence also supports the notion that learners' movement skills are stepping stones not only for the development of, but also for the promotion of their self-image and -perceptions (Ekeland *et al*., 2005:792).

The relationship between perceptual-motor skills as well as social and emotional development, is often due to the interaction with others which comes from the participation in movement programmes (Piek *et al*., 2010:78). A programme called, "The animal fun programme", was implemented in Australia and New Zealand to improve gross motor skills as well as social development in learners from four to six years of age (Piek *et al*., 2010:78). This specific intervention programme showed significant improvement in motor abilities, social behaviour and total emotional development over a time period of six months (Piek *et al*., 2010:78).

Learner's perceptual-motor skill development is not just beneficial for emotional and social development, but also for learners' sport development, which will be discussed next.

1.3.2.4 Sport development

As mentioned previously, the development of fundamental movement skills set a foundation for the development of more sport-specific skills (Donnelly *et al.*, 2017:44; Hands, 2012:11). The development of basic movement patterns thus leads to the performance of more advanced sport skills (Leah *et al*., 2015:1273. Fundamental movement skills reach optimal maturity around the age of seven years (Donnelly *et al*., 2017:62). According to these authors, if the mature phase is not developed properly, the difficulty in learning more sport-specialised skills will increase (Donnelly *et al*., 2017:62). A study by Pienaar *et al*. (2005:118) showed that it is more likely for learners and people in general to participate in sport-specific activities, if they have developed the necessary skills in their early childhood years. The learning of sport skills will also develop more quickly and accurately, if the fundamental movement skills and phases were successfully developed (Pienaar & Spamer, 2005:43).

The above studies highlight the importance of including perceptual-motor skills in learners' daily lives. However, lower socio economic schools in developing countries like South Africa, often experience challenges in providing opportunities for learners to develop their motor skills, and these will be discussed in more detail

1.3.3 Challenges for learners in rural schools in South Africa

In rural schools it has been found that children struggle more with physical, perceptual and conceptual development, because of the lack of exposure to fundamental motor skill development and resources (O'Brien *et al*., 2016:557). Various researchers indicate that, when learners are exposed to unsafe environments, they are at risk of developmental delays and poor academic performance (Ferguson *et al*., 2001:328; Goodway & Branta, 2010:36; Goodway & Robinson, 2009:543). Furthermore, poverty, often associated with rural areas, has an influence on development, because of fewer educational resources, pollution, disorganised home neighbourhoods and unsafe environments (Bronfenbrenner, 2005:89; Ferguson *et al*., 2001:327). Hardy (2010) states that rural schools often face challenges where most teachers are not qualified

to teach the necessary fundamental movement skills, implying that these teachers have little or no training. As a result, these teachers feel less confident and competent in teaching fundamental movement skills (Morgan & Hansen, 2008:506). This leads to unrecognized learner differences, inappropriate movement programmes and the lack of providing opportunities (Breslin *et al*., 2008:429).

In a study on the differences in perceptual-motor skills among pre-school children in Portugal, Antunes *et al*. (2018:2290) found that the geographical area, whether rural or urban, as well as the socio-economic environment of learners, correlated with their levels of perceptual-motor development. These authors named the access to quality gross motor programmes and access to facilities, as possible reasons for the differences in gross motor skill levels among the urban and rural learners in their study (Antunes *et al.*, 2018:2290). Similarly, Barnett *et al.* (2016:1685), in an overview study on the correlates of gross motor proficiency of children and adolescents, found that the socio-economic backgrounds of learners influenced their levels of gross and perceptual motor development, the reasons being quality stimulation during the pre-school years, safety and access to teaching.

In South Africa, specifically in rural schools, there is a great need for quality Physical Education programmes, as Physical Education is often neglected or left out of the school programme (Stroebel *et al*., 2016: 225; Van Deventer & Van Niekerk, 2009:158).

Consequently, the effects of Physical Education and gross motor intervention programmes on the gross motor skill levels of learners in other countries, and in South Africa in the Foundation Phase, will be discussed.

1.3.4 Studies regarding the effects of motor intervention programmes in other countries

A motor development programme, whether it is part of Physical Education or not, has a significant role in the development of learners' foundation for lifelong involvement in physical activity and a healthy lifestyle (Barnett *et al*., 2008:12).

In Denmark several programmes were implemented by municipalities and sport organisations to improve motor skills among young learners (Wedderkopp *et al*., 2012:128). A study on one such programme in the form of Physical Education in 12 primary schools, in a project called *CHAMPS-DK (Svenborg Project)*, was conducted

by the municipality of Svendborg in cooperation with the University of Southern Denmark (Wedderkopp *et al*., 2012:128). The study involved 505 Grade 1 learners from 12 primary schools, and the results showed that the 9-months programme significantly improved the learners' motor skills (Wedderkopp *et al*., 2012:128).

In Southwest Finland, a motor intervention programme was designed specifically to determine if improved fundamental movement skills can be associated with increased levels of physical activity. Locomotor, manipulative and balance skills were measured among 111 five- to six-year-old children, and the results revealed that the improved fundamental movement skills following the 12-week intervention programme, were linked with higher levels of physical activity (Barnett *et al*., 2008:40). The results also indicated that fundamental movement skills can be improved, after the critical developmental period of two to seven years of age (Barnett *et al*., 2008:44). According to Stodden *et al*. (2008), the ability to perform fundamental movement skills increases the participation in different physical activities throughout children's lives.

Brazil is seen as one of the most socially vulnerable countries, which means that there is a lack of appropriate care, health services and inadequate housing in neighbourhoods, which expose children to inadequate developmental opportunities and also affect children's sport and motor skills negatively (Nobre & Valentini, 2018:343). In the study of Nobre and Valentini (2018:343), investigating the effect of an intervention programme among 211 seven- to ten-year old learners in a low socio-economic area, the focus was on the development of fundamental movement skills and the relationship it would have on school performance. The study concluded that learners who showed improved levels of competence in motor development, showed improved school performance.

A programme called Comprehensive School Physical Activity Programme (CSPAP), which entailed an approach to promote physical activity and develop motor skills (Burns *et al*., 2017:284), was put into practice in the United States of America (USA). The results illustrated that the 12-week CSPAP programme improved gross motor skills among the 1460 five-to-eleven-year-old learners, which led to the increase of physical activity, fitness levels and cardio-metabolic health among the participants (Burns *et al*., 2017:284).

In the study among 75 five year old learners in the USA, the fine motor skills of the learners improved after participating in a motor intervention programme of 10 weeks (Ohl *et al*., 2013:507). Bryant *et al*. (2016) also found in a study in Central England, that a one-day-per-week Physical Education intervention programme, focusing on fundamental movement skills, enhanced motor skills amongst the eight-year old participants in their study.

From the above studies, it can be concluded that Physical Education and motor intervention programmes can have a positive effect on children's motor skill development. Results from South African studies will be discussed next.

1.3.5 Studies of the effects of motor intervention programmes in South Africa

In Stellenbosch, South Africa, a motor skill development programme for 67 learners was designed to focus on improving balance and bilateral coordination for children between the ages of nine and 12 years (Africa & Van Deventer, 2015:11). After completing the programme, improvements in balance and bilateral coordination were noticed, which led to the conclusion that the intervention programme had played a role in developing these skills (Africa & Van Deventer, 2015:11). Van Niekerk *et al*. (2007:159) implemented a 10-week intervention programme in the North-West Province among 24 learners between the ages of seven and fourteen years and found similar results.

Another study was done in Stellenbosch, South Africa, by Barnard *et al.* (2014:8) among 149 Grade 2 learners, to determine whether there was a relationship between perceptual-motor skills, participation in physical activity and cognitive functioning. During the designed programme, different activities were integrated, including balance, coordination, body awareness, directionality, laterality, midline crossing and spatial orientation activities, all to stimulate the development of sensory and perceptual motor skills (Barnard *et al*., 2014:8). The results of this research showed improvement in perceptual-motor skills, mathematical and literacy abilities, and spelling (Barnard *et al*., 2014:8).

Research, done by the University of Zululand in Kwa-Zulu Natal reported on the influence of a kinder kinetics intervention programme (consisting of gross and perceptual-motor activities) on the scholastic performance of children aged six to eight

years (Gouws, 2015:7). Results showed acceleration in the participants' psychomotor development after implementing the 8-week kinder kinetics intervention programme, which also led to improved academic skills (Gouws, 2009:7). It can be concluded from the results of the above studies that a gross motor intervention programme, or a quality Physical Education programme presented by a well-trained Physical Education teacher, can play a significant role in the improvement of gross motor skills of young learners. Unfortunately, in some cases children do not achieve early childhood developmental milestones and lead physically active lifestyles, because of too much time spent on sedentary activities, like watching television and playing computer games (Hands, 2012:12). When sedentary lifestyles have been adopted by children, low levels of motor skills and competence when participating in physical activity, are observed (Robinson *et al*., 2012:543). For optimal development and progress, sufficient time needs to be allocated to opportunities for learning developmental skills and to master these fundamental skills (Hands, 2012:11), as is prescribed in the Physical Education section of the Foundation Phase Life Skills curriculum in the Curriculum and Assessment Policy Statement (CAPS) (DBE, 2011:21).

In rural areas, another reason why some children in Grade 1 lack the motor competency that is expected at their age, is that they often do not get optimal stimulation and physical practise in their pre-school years to develop these skills (Pienaar & Kemp, 2014:10). In many lower socio economic schools in South Africa, Physical Education is not presented according to the curriculum, or not at all due to a lack of trained or qualified Physical Education teachers (Pienaar & Kemp, 2014: 174; Stroebel *et al.,* 2016:216; Van Deventer, 2011:832). Furthermore, few studies have investigated the effect of a gross motor intervention programme, in the form of a quality Physical Education programme presented by a specialist Physical Education teacher, upon learners' perceptual-motor skills in lower socio economic in South Africa; therefore, this study aimed to address this gap in the literature by investigating the effect of such a Physical Education programme on the perceptual-motor skills of learners in a selected rural school in South Africa, specifically in Qua-Qua, in the Free State.

1.4 Research questions, aims and hypotheses

1.4.1 Research questions

The primary research question that emerged from the above is:

1.4.1.1 What are the effects that a Physical Education programme, presented by a specialist Physical Education teacher, has on the perceptual motor skills of Grade 1-learners in a selected primary school in South Africa?

To be able to answer the above question, the following secondary question was answered:

1. 4.1.2 How do the perceptual-motor skills of Grade 1-learners in a primary school in South Africa, compare to those of their peers of the same age, before the commencement of the Physical Education programme?

1.4.2 Aims

The primary aim for this study was:

1.4.2.1 To determine the effects of a Physical Education programme, presented by a specialist PE teacher, on the perceptual motor skills of Grade 1-learners in a selected primary school in South Africa.

The following secondary aim was set for the study:

1.4.2.2 To determine the levels of perceptual-motor skills of Grade 1-learners in a primary school in South Africa, in comparison with age norms, before the commencement of the Physical Education programme.

1.4.3. Hypotheses

According to the above aims, the following hypotheses were set:

1.4.3.1 A Physical Education programme, presented by a specialist Physical Education teacher, will have a positive effect on and improve the perceptual motor skills of Grade 1-learners in a primary school in South Africa.

1.4.3.2 The levels of perceptual-motor skills of Grade 1-learners in a primary school in South Africa, will be below average in comparison with age norms, before the commencement of a Physical Education programme.

1.5. Methodology

1.5.1 Research design

This study entailed quantitative research, where the researcher relied on numerical data to determine a relationship between variables (Suter, 2006:464). According to Thomas *et al.* (2008:18) quantitative research focuses more on the statistics, for the purpose of proving and understanding a research topic. Quantitative research also refers to a deductive approach, where a hypothesis is designed to either prove or reject the study (De Vos, 2011:48). This study further utilised a pre- and post-test design (De Vos, 2011:62) as the perceptual-motor skills of the participants were tested before and after the implementation of the Physical Education programme.

1.5.2 Theoretical perspective

This study was conducted from a positivistic approach. Positivism is used for social research that applies the natural science model of research to investigations of social phenomena and explanations of the social world (Denscombe, 2008:14). According to Ary *et al*. (2010:23), positivism is a research philosophy that is known for its objectivity that is based on independent variables. Positivism requires the researcher to follow a distant, detached and neutral approach with a non-interactive position (Morris, 2006:3). Positivists also believe that the knowledge is based on science (Welman, 2005:11).

Thus, in this study numerical data were used to determine the effect of the programme on the variables of the study, and therefore to prove or reject the set hypotheses.

1.5.3 Selection of participants

This study was conducted in a primary school in Qua-Qua, which is a low socio-economic rural area in the Free State, where Physical Education was not formally presented before the commencement of the study. All the Grade 1learners, between the ages of six and eight years from one school who were selected as a convenience

sample to participate in this study (De Vos, 2011:32). The total number of Grade 1learners at the school was 103 learners (57 boys and 46 girls). The learners were randomly divided into the four classes (25 to 28 learners each) at the beginning of the year. The participants that were used for the experimental group for the study were the first three classes of the Grade 1learners on the list of classes totalling 78 learners, while the remaining Grade 1 class of 25 learners, was chosen as the control group. The control group's age and circumstances were therefore similar to those in the experimental group, except for the Physical Education programme that was not presented by a specialist Physical Education teacher. In a courtesy agreement with the school, and so that the control group will not be disadvantaged, the 10-weeks PE programme will also be presented to the control group after the completion of the study.

Although only the data of learners between the ages of six and eight years was used for the research study, all the Grade 1's in the experimental group school participated in the PE programme and the evaluations. Everyone received feedback from the researcher.

1.5.3.1 Inclusion and exclusion criteria for the participants

1.5.3.1.1 Inclusion and exclusion criteria for the experimental group:

Learners were included in the experimental group if they:

- were in the first three classes of Grade 1's on the list of the school;
- were between six and eight years of age (learners who were not between six and eight years, still participated in the PE programme, but their data were not used for the study);
- were Grade 1learners of the school between the ages of six and eight years;
- were present and participated in at least 80% of the Physical Education classes;
- provided signed, parental permission forms from their parents / guardians to participate;
- provided verbal assent, in the presence of an independent witness, to participate in the programme.

Learners were excluded from the experimental group if they:

- were Grade 1learners older than eight years of age (learners who are older than eight years, still participated in the PE programme, but their data were not used for the study);
- were not present and did not participate in at least 80% of the Physical Education classes;
- did not provide signed parental permission forms from their parents or guardians; and
- did not provide verbal assent in the presence of an independent witness.

1.5.3.1.2 Inclusion and exclusion criteria for the control group:

Learners were included in the control group if they:

- were in the fourth Grade 1 class on the school's list;
- were Grade 1learners of the same primary school between the ages of six and eight years (learners who were not between six and eight years, still participated in the PE tests, but their data were not used for the study);
- provided signed parental permission forms from their parents / guardians to be part of the control group;
- provided verbal assent in the presence of an independent witness, that they would participate as part of the control group;

Learners were excluded from the control group if they:

- were not between the ages of six and eight years (learners who were not between six and eight years, still participated in the PE tests, but their data were not used for the study);
- did not provide signed parental permission forms from their parents to be part of the control group; and
- did not provide verbal assent in the presence of an independent witness, that they would participate as part of the control group.

1.5.4 Measuring instruments

The perceptual-motor skill tests were a collection of tests obtained from standardised motor skill and proficiency test batteries (Bruininks & Bruininks, 2005; Donnelly *et al.,* 2017; Frankenburg *et al.*, 1996; Henderson *et al*., 2007; Gallahue & Ozmun, 2006;

Mutti *et al.*, 2012. Ulrich, 2015) based on the selection of tests used by Du Toit (2002:23) to test the gross-motor and perceptual motor skills of Foundation Phase learners. The skills that were selected as the perceptual-motor skills to be tested were hopping, skipping, one-leg balance, balance walk, throwing-for-distance, catching, kicking and "jumping jacks". These skills were selected for three reasons:

1) They represent the three categories of movement, namely basic locomotion (standing long jump, hopping and skipping), balance (one leg balance and balance walk), and manipulation (throwing and catching) (Donnelly *et al*., 2017:12);

2) they are used extensively in established and standardised motor test batteries for children within these age groups (Bruininks & Bruininks, 2005; Frankenburg *et al*., 1996; Henderson *et al*., 2007; Mutti *et al*., 2012; Ulrich, 2015); and

3) they are suitable to use in the form of an assessment test in a Physical Education programme because of their simplicity and compatibility with the type of activities used in Physical Education in the Foundation Phase.

Body and spatial awareness were also tested using the "finger-to-nose" test (Muti *et al*., 2012:34). The skills were evaluated based on the following procedures:

Hopping (Ulrich, 2015; Frankenburg *et al*., 1996). The test entails two trials of hopping forward on each leg as many times as possible, up to a maximum of 12 hops. The higher score is taken.

Skipping (Mutti *et al.*, 2012). The skipping pattern (step, hop, step, hop) was demonstrated by the researcher whereafter the participant was asked to skip across the room. The number of skipping steps done correctly, to a maximum of four, was taken as the score.

One leg balance (Bruininks & Bruininks, 2005; Frankenburg *et al.*, 1996; Henderson *et al.,* 2007; Mutti *et al.,* 1998). The test entailed two trials of balancing on one foot, with the arms hanging at the sides, for as long as possible up to a maximum of 12 seconds. The participant was instructed to stand with the free leg bent backwards at the knee and kept off the floor. Swaying was allowed, and the arms were allowed to move from the sides. Balancing was tested on both legs (alternatively), and the better of the two trials taken as the score.

Balance walk (Bruininks & Bruininks, 2005; Henderson *et al.,* 2007; Mutti *et al.*, 2012). The learners were asked to walk heel-to-toe on a low balance beam (2.5 m. long, 100 mm. wide and 300 mm. high), and then walk heel-to-toe backward on the beam. The score was the distance correctly placed heel-to-toe up to a maximum of 1.5 m. Two trials were allowed.

Catching (Ulrich, 2015; Folio & Fewell, 2000; Henderson *et al.,* 2007). The test measured the ability to catch a 20cm ball with two hands, thrown underhand. The thrower was positioned two meters away from the participant. The score was the number of successful catches off five throws.

Ball kick (Drop kick) This test measured the learners' ability to kick a soccer ball. The researcher demonstrated the technique first. The ball had to be held above the ground and when the ball was released from the hands, a drop kick action had to take place, showing correct timing and rhythm. Three trials were allowed.

The finger-to-nose test (Bruininks & Bruininks, 2005; Mutti *et al*., 2012) is a body and spatial awareness test that also tests the child's motor planning and control. The learner held her/his arms stretched out to the side, at shoulder height, the researcher asked the learner to touch his/her nose with their index finger. The learners then had to close his/her eyes and reach back and forth, three times.

Reliability was assured by the researcher, which performed the perceptual-motor tests exactly according to the instructions of each test item.

1.5.5 Data collection procedure

The first perceptual-motor tests were conducted among the experimental and control groups in the beginning of the year. After the first perceptual-motor tests, the learners from the experimental group participated in a Physical Education programme, once a week, for 10 weeks. After the 10-week programme was completed, the second set of perceptual-motor tests were done on the experimental and control groups by the researcher. The control group was also tested using the perceptual-motor tests before and after the Physical Education programme. After the completion of the PE programme with the experimental group and the tests after the programme, the control group also received the PE programme presented by the researcher, so that they will not be disadvantaged in any way.

1.5.6 The Physical Education programme (Addendum L)

The programme occurred on the school premises, during school hours. The programme was implemented over a period of 10 weeks, which consisted of a one-hour lesson once a week (the total group was divided into three classes that each participated in the programme once a week), by a teacher with a BEd Honours degree, specialising in Physical Education. Each lesson was compiled according to the guidelines of the CAPS for Physical Education, and consisted of a warm-up, which included locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a nearby colour, shape or pattern. The main part of the lesson consisted of activities presented at stations, with each station consisting of a different fundamental movement skill from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). Each lesson finished off with an appropriate cool down activity, for example stretching activities. The programme also included certain elements like rhythm and target games. Improvised apparatus such as hurdles, coloured shapes, bean bags, cones and balance apparatus were made to use in the programme.

1.5.7 Data-analysis

For the analysis of the data, the Statistical Services of the North West University (NWU) was consulted and the IBM SPSS (SPSS, 2018) computer programme was used for descriptive statistics, namely mean values, standard deviations, and minimum and maximum values. Because a convenience sample was used to examine the practical significance of differences, effect sizes (ES) will be calculated for the interpretation of differences within and between dependent and independent groups to see whether there are significant differences between the experimental group and the control group, as well as the scores before and after the PE programme, as recommended by Cohen (1988) and Steyn (2006). In this regard, Cohen (1988) and Steyn (2006) propose that an ES of 0.2 represents a small effect, 0.5 a medium effect and 0.8 a large effect. However, p-values yielded by independent and dependent t-tests will be reported for completeness sake as if random sampling were done. Independent t-tests will be used for the pre-tests and paired t-tests within the groups

over time, and an ANCOVA which will correct for pre-tests, will be used for the post-tests.

1.5.8 Ethical aspects

This study was approved by the Education, Management, and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (NWU-EMELTEN-REC) of the North-West University (NWU-00530-19-A2). Although the Physical Education programme as well as the perceptual-motor skills tests forms part of the normal, compulsory curriculum of Life Skills (Physical Education) as prescribed by the CAPS (DBE, 2011:10), this study could be considered high risk for ethical purposes as minors were involved. An application for ethical approval was made to the Ethics Committee, as well as an application to the principal (Addendum C) and the governing body (Addendum G) of the school for permission to conduct the study. As the school is an independent school which does not fall under the jurisdiction of the Free State Department of Education, it was not necessary to ask permission from the department.

An independent person (a teacher at the school who was not involved in the study or the relevant phase, the Foundation Phase, and who could speak the learners' native language) informed the parents of the participants about the Physical Education programme during an information session at the school in English as well as their home language. The independent teacher also provided information on the intervention programme at the school before the onset of the study, together with the researcher, and the principal of the school who acted as gatekeeper. The information provided by the independent teacher at these parents' meetings included a clear explanation of the risks and benefits of involving their children in the study. The researcher was also present during the meetings to answer questions in the event that parents had questions to ask regarding the study. Parents were provided with the informed permission forms (Addendum A and B) at the meeting and asked to take the forms home to read through before signing and sending them back to the school. After the parents' permission forms had been received, the independent teacher explained the details of the study, which included the possible risks and benefits to each Grade 1 learner using the pictures in Addendum J and asked for the verbal assent of the

learner. The independent teacher signed a witness declaration form (Addendum E) that she had witnessed the learner giving verbal assent.

All the collected data were kept confidential and the data of the participants were anonymously used, by using numbers instead of names, when analysing and reporting the results. After the first tests, and after the completion of the Physical Education programme and the second tests, the test results of each individual learner were only made known to the parents of that learner. The names of participants and results of learners were not made known to the school, although the parents were informed that they could discuss their child's results with their child's teacher if they wanted to. The researcher also provided general (group) feedback on the results of the study at a parents' meeting after the study, and here the researcher also demonstrated some of the exercises that the parents could do at home with their children, to improve their perceptual-motor skills.

All the data were kept confidential and the data of the participants were anonymously used when results were analysed and reported. The results of the study are kept confidential and stored on the study leader's computer, protected by a password. Hard copies of the findings were kept safe in locked cupboards in the study leader's office, to which only the study leader and researcher had access to, and electronic data were password-protected. Data will be stored for seven years after which it will be destroyed (hard copies shredded, and electronic copies deleted). The findings of this study will not be used in future for related PhD studies and topics.

During the participation in the Physical Education programme, all safety measurements which are normally applicable to Physical Education classes, were taken to ensure that no learner would be harmed, physically or emotionally (among others, allowing sufficient rest between tests and activities, communicating continuously with learners about how they were feeling and whether they wanted to rest or stop, using an open and clean area, sufficient space for each learner, small progressing steps on the learners' developmental levels when teaching new movements, clear instructions and clear circuits of simple activities). The teacher provided activities where all learners were kept active at the same time so that learners who were being tested or who were doing activities would not be singled out or put on the spot before other learners. The unlikely risk of physical injury always exists in PE lessons, but the teacher was well-trained to apply all pre-cautionary safety measures

in the PE class to minimise possible injuries, and she was trained in First Aid in case an injury should occur. A First-Aid kit was always at hand (as prescribed for any PE lessons). Participation was voluntary, which meant that a learner could withdraw from the study at any time.

A certificate of participation (Addendum K) was awarded to each participant after the completion of the programme, during a school assembly. After the study, the relevant teachers of the school received training by the researcher to present the programme themselves.

1.6. Contribution towards the field of Physical Education

It is important that learners participate in physical activities, such as this quality Physical Education programme, to develop their motor skills and to develop overall fitness. According to the Grade R-3 CAPS (DBE, 2011:10), learners must participate in physical activities two hours per week. Implementing a quality Physical Education programme can enhance learners' abilities and will also lead to better results regarding other aspects of their development. The results of the study further emphasize and enhance the awareness of the importance and benefits of quality Physical Education programmes in the Foundation Phase.

1.7. Structure of the dissertation

The chapters include the following:

Chapter 1: Introduction, problem statement, objectives and hypotheses

Chapter 2: The importance of optimal perceptual-motor development in the Foundation Phase

- 2.1 The phases of perceptual-motor development in childhood
- 2.2 The relationship between perceptual-motor skills, social and emotional development
- 2.3 The relationship between perceptual-motor skills and physical development
- 2.4 The relationship between perceptual-motor skills, cognitive development and academic performance
- 2.5 The relationship between perceptual-motor skills and sport development

Chapter 3: The nature and effects of quality Physical Education programmes in the Foundation Phase

3.1 The characteristics of quality Physical Education in the Foundation Phase

3.2 Studies on the effects of quality Physical Education programmes in other countries

3.3 Studies on the effects of quality Physical Education programmes in South Africa

3.4 Challenges facing schools in rural areas regarding the implementation of Physical Education

Chapter 4: Methodology

Chapter 5: Results and discussion

Chapter 6: Conclusions and recommendations

Following in Chapter 2, the value of perceptual-motor development will be discussed in more depth.

CHAPTER 2:

The importance of optimal perceptual-motor development in the Foundation Phase

2.1 Introduction

The value of perceptual-motor development has been touched on in Chapter 1, but will be discussed in more depth in this Chapter. According to the Curriculum and Assessment Policy Statement (CAPS) (DBE, 2011:6), PE in the Foundation Phase in schools should focus on physical growth and development, perceptual-motor development, games, sport as well as play. Although all these aspects contribute to the development and promotion of a healthy and active lifestyle, the most important goal of past and present PE programmes according to Siedentop (2001:211), has always been to obtain and develop motor skills. The aims of PE further include developing the children's knowledge regarding movement and safety and improving their physical well-being. Thus, PE will accordingly cultivate positive values and attitudes that help children to be physically fit, mentally alert, socially well-adjusted, mentally balanced, spiritually uplifted and morally steadfast (Donnelly *et al.,* 2017: 15). Therefore, in this chapter further detail will be added to the discussion regarding the importance of perceptual-motor skills being included in the Foundation phase.

However, before emphasising the value of the optimal development of perceptual-motor skills, it is necessary to understand the different phases of perceptual-motor development through which a learner should progress in order to develop his or her motor skills optimally.

2.2 The phases of perceptual- motor development in childhood

Motor development is a continuous and an age-related process of change in movement skill acquirement (Donnelly *et al.*, 2017:24; Pienaar, 2012:5). This process is influenced by various factors in the individual and the environment (Pienaar, 2012:5). Motor development consists of different phases and stages that a child progresses through from birth to adulthood.

The first phase of motor development is the reflexive phase (Donnelly *et al.*, 2017:39). This phase begins during foetal development and continues until after birth. Babies are born with the need to move and with sensory functions that are ready to be used. All movements in this stage occur as reflexes, which are controlled subconsciously (Donnelly *et* al., 2017:39; Haywood *et al*., 2012:93; Pienaar, 2012:7). Reflexes can be divided into two types, namely primitive reflexes that are used to gather information, for example, sucking reflexes, and postural reflexes that serve as neuro-motor transmitters for stability, locomotor and manipulative actions (Haywood *et al*., 2012:91). An example of a postural reflex is the stepping reflex. Later in this stage these reflexes are replaced by voluntary movements that involve sensory stimuli that store information (Donnelly *et al.,* 2017:40).

The second phase of motor development is the rudimentary phase (Coh *et al*., 2004:50; Donnelly *et al.,* 2017 40). This phase begins after birth and continues to the age of two years. The rudimentary phase includes voluntary movements, like locomotor skills such as crawling and walking; manipulative skills such as grasping and releasing, and stability skills such as controlling the head, neck and torso during sitting and standing activities (Donnelly *et al.,* 2017:40; Kokot, 2006:7). Infants have little control over fine motor movements, however, and these will only later develop into finely-coordinated arm, hand and finger movements as the infant's hand-eye coordination skills mature (Donnelly *et al.,* 2017:40; Pienaar, 2012:8).

The development of the two above-mentioned phases is especially important for the fundamental and more specialised movement phases that will occur later in the childhood years (Donnelly *et al*., 2017:39; Pienaar, 2012:8).

The third phase of motor development occurs in the early childhood years of two to seven and this phase is known as the fundamental movement phase (Donnelly *et al.*, 2017:38). In this phase the fundamental movement skills are developed and refined, consisting of the following skills: locomotor (for example, running, jumping and skipping), manipulative (for example, throwing and catching), and stability (for example, balancing on one leg and walking on a balance beam) (Pangrazi *et al*., 2011:316).

The development of fundamental motor skills can be subdivided into three stages, including an initial, elementary and mature stage (Donnelly *et al*., 2017:40; Pienaar,

2012:8). The initial stage occurs between the ages of two to three years, during which movements are crude and uncoordinated. The elementary stage occurs between four and five years of age and in this stage learners achieve more control over their movements, because coordination and rhythmic performance are improving. The mature stage occurs between the ages of six and seven years, during which movement skills are categorised as well-coordinated, mechanically- correct and as having a smooth and flowing execution (Donnelly *et al.,* 2017:40). Once criteria for the mature phase have been reached, motor skills can be developed into sport-specific skills. According to Pienaar (2012:9) the development of mature movement patterns forms the basis of all sport skills. If these skills do not develop into the mature stage, the development of specialised movement skills later in a child's life, will be compromised.

The fourth and final phase is the specialised movement skill or sport-related movement phase starting at the age of seven years, when motor skills become sport-specific. This phase can also be subdivided into stages, which include the transitional, the application and the lifelong utilization stage (Donnelly *et al.,* 2017:40; Gallahue & Donnelly, 2003:64; Pienaar, 2012:21).

Learners in the transition stage are usually between the ages of seven and 10 years (Donnelly, 2017:42). In this stage further development and refinement of motor skills occur. The learners develop an interest in competing in different sports, although the skill performance is still limited. However, the focus is now on accuracy and skill refinement of certain sport skills, and the application there-of in sports-related games (Gallahue & Donnelly, 2003:64; Pienaar, 2012:21).

The application stage occurs during late childhood between the ages of 11 and 13 years (Donnelly, 2017:43). In this stage the focus is placed on improving and refining specific skills, technique and style through repetitive practice (Donnelly *et al.,* 2017:40; Gallahue & Donnelly, 2003:65; Pienaar, 2012:24). The final stage is the lifelong utilisation stage which occurs from the age of 14 years (high school years) and onwards, during which the further refinement of specific techniques takes place (Donnelly *et al*., 2017:44). This stage is dependent on the previous sport and fundamental skill stages, as the mastered skills and techniques can now be applied in specific sports or performance-orientated activities (Donnelly *et al*., 2017:44), although

the development of specialised movement skills is also dependent on interest, encouragement and further instruction (Pienaar, 2012:24).

From the above, the importance of stimulation, knowledgeable instruction and opportunities to develop movement skills in the early childhood years, becomes clear. The learner, thus, must move through the phases of motor development to be able to participate in physical activities and sport when he or she reaches adulthood (Donnelly *et al*., 2017:34). The importance of optimally- developed perceptual-motor skills will further be illustrated in the following discussion of the relationships between these skills and different aspects of the learner's development, namely social, emotional, physical, cognitive and sport development.

2.3 The relationship between perceptual-motor skills and physical development

The development of perceptual-motor skills lays the foundation for future movement skills (Clark & Metcalfe, 2002:70), as motor skills are a requirement and foundation of skills practised in adult physical activity (Payne & Isaacs, 2008:201). This means that a relationship exists between physical activity and motor skills (Okely *et al*., 2001:1899). Physical activity is described as any bodily movement executed by the skeletal muscles that leads to the increase in output energy (Bouchard *et al.*, 2007:10). In this regard, research shows a strong and positive association between the effects of early motor skill proficiency and adulthood physical activity (Lloyd *et al*., 2014:67). It has also been found that a physically active lifestyle is an important factor for health benefits among people of all ages (Ross & Janssen, 2007:180), which further implies that the development of perceptual-motor skills can also indirectly affect the physical health of children. Conversely, according to Sääkslahti (2005:143), a physically active lifestyle in early childhood forms the basis for the development of perceptual and fundamental movement skills. Supporting this statement, Fisher *et al*. (2005:684) report that, when children spend more time on moderate-to-vigorous physical activity, their levels of motor proficiency are usually higher. Children who are physically active are also more likely to be physically active adults, thus enhancing their health throughout their lifespan (McKenzie *et al*., 2004:240).

Increasing the participation in physical activity through well-developed motor skills, may further address the high obesity rates among children and the youth (NCHS, 2010; Whitlock *et al.*, 2005:116). Obesity is a growing problem due to a sedentary lifestyle, where no form of physical activity occurs (WHO, 2017). The inactivity has lifelong negative effects, with a strong correlation between childhood and adult obesity (Guo *et al.*, 2002:76). It has, furthermore, been reported that overweight and obese children tend to be less proficient in perceptual-movement skills and have lower levels of physical activity participation, compared to children who are not considered overweight (Logan *et al.*, 2012:305). Furthermore, Veldman *et al*. (2016:305) suggest that proficiency in fundamental movement skills results in better health outcomes in children, such as a decreased body mass index and increased aerobic fitness. This confirms, according to Lloyd *et al*. (2014:70), the importance of developing fundamental movement skills in early childhood, and reducing the risk of cardiovascular and metabolic diseases through continued physical activity into adolescence. In support of this statement, Meredith and Welk (2007:19) state that it is important for learners to participate in age–appropriate physical activities for at least 60 minutes of moderate intensity per day, three days per week, as this will promote motor skill development and establish physical activity patterns.

Optimal physical health and motor skills affect all other aspects of children's development, including their social and emotional development, which will be investigated further.

2.4 The relationship between perceptual-motor skills, and social and emotional development

Research shows that motor skills can influence a child's social and emotional development (Cairney *et al*., 2013:224). It also has been proven that the participation in physical activity can optimize emotional expressions, and social skills as well as the construction of the child's personality and behaviour (Gil-Madrona, 2008:165).

Social skills can be defined as learned behaviours that involve interactions with others which enable individuals to function competently in social tasks (Cook *et al*., 2008). The importance of the development of social skills is of the essence, because it is a multi-dimensional process that must occur to reach maturity. This process of social skills development lays the foundation for future learning, therefore the quality and

quantity of stimuli that children receive, must be closely monitored (Bakken *et al*., 2017:255). Part of this process is the involvement of children in physical activities which allows children to be socially well-adjusted, mentally balanced, emotionally uplifted and morally true (DBE, 2011:6). Children with developmental disorders, including motor skill deficits, often experience interpersonal difficulties, low self-competence, increased levels of obesity and internalizing problems like anxiety and depression (Cairney *et al*., 2013:224). Also, according to Campbell *et al*. (2012:328) and Piek *et al*. (2005:453), children with developmental disorders see themselves as less competent when comparing themselves to others, and this increases peer victimization by motor-competent children. Increased levels of motor skill competence are thus linked with positive self-perceptions, which motivate children to participate more in physical activity (NSCDC, 2007:25). Conversely, when children have lower levels of motor skill competence, they will be less likely to engage in physical activity (Stodden *et al*., 2008:290).

During the early childhood years, children should develop positive self-perceptions during the motor developmental phases (LeGear *et al*., 2012:29; Robinson, 2011:589). Movement facilitates the development of the perceptual component of body awareness, that includes knowledge about self-concept, own body, and the internal awareness of the relation of body parts to one another (Donnelly *et al*., 2017:25). A negative experience in movement can thus affect the body image of children negatively, while participation in movement activities strengthens the confidence and self-concept of a child (Cheatum & Hammond, 2000:468). Furthermore, it has been proved that physical inactivity can lead to obesity and other related health problems (Gupta, 2012:48). Being overweight and obese again causes psycho-motor limitations, which increases the outcome for social discrimination, low self-esteem and depression (Lobstein et al., 2004:40). Lobstein (2004:45) states that, in this way, overweight and obesity affects the social-emotional skills of children.

Social and emotional skills can thus be developed through the development of motor skills (Vidoni & Ward, 2009:611). Better motor skills result in stronger neural connections in the brain, which improve learning and brain functioning, which again leads to more effective social interactions (Elison, 2013:899). Therefore, the development of motor skills can be considered as an important factor of social relationships (Ali, 2001:146). Shafiabady (2008:304) points out that various factors

can influence social development, including verbal and non-verbal skills, social understanding and motor skills. These skills are developed during childhood, which means that a child's social, emotional, cognitive and physical aspects must be considered, otherwise the child can end up being vulnerable and emotionally unstable.

Studies (Gutiérrez, 2004:105; Metzter, 2005:202) show that participation in sport contributes towards the development of social and emotional skills. Sport corrects social imbalances that might occur, contributes to equality, creates habits for social inclusion and encourages teamwork (Gutiérrez, 2004:110). As mentioned before, in order to be able to participate in sport, a learner's motor skills should be optimally developed (Donnelly *et al*., 2017:21).

The conclusion can then be made that motor development is critical for the development of social skills. Children who are proficient in motor skills are also often determined to learn more skills and be more physically active, which leads to increased motor proficiency, which again promotes continued participation in physical activities and increased opportunities for the development and application of social skills

Evidence also suggests that increases in time devoted to PE and physical activity during school hours, may maintain or even improve grades and standardised test scores, and will not negatively affect academic performance (Trost, 2007:2). The relationship between perceptual-motor skills, cognitive development and academic performance will be discussed further now.

2.5 The relationship between perceptual–motor skills, cognitive development and academic performance

The previously-discussed literature highlights the fact that it is critical for learners in their early childhood years to develop and establish a proficiency in fundamental movement and motor skills which have an impact on the learners' physical and social development. During infancy a learner's physical development is also evaluated through motor and perceptual abilities which have a definite influence on the child's development and learning (Cools *et al*., 2009:154). According to Puckett and Black (2005:350), the movement of the body plays an important part in all intellectual processes. Movement is thus seen as the basis to help the brain integrate in preparation for academic performance, and a lack of movement is seen as a main

contributor to learning restraints (Pheloung, 2003:53; Ahamed *et al*., 2007:371). Movement, and the associated motor skills, is particularly critical between the ages of two and six years as it is during this period that muscle strength, coordination, balance and spatial skills are developed which have a tremendous impact on cognition (Jensen, 2000:60; Ratey, 2008:45). In these critical years neural pathways develop through the process of myelination, where the growth of dendrites and synapses form connections and neuron junctions in the brain (Leppo *et al.*, 2000:142; Voelcker-Rehage *et al*., 2010:167).

According to Thompson (2008:11) brain development is an ongoing process between the child and its environment, where sensory and motor skills are linked. Different sensory motor experiences help the brain to develop in various ways (Thompson, 2008:11). Thus, movement is important in learning and memory, and this is created by an exercise-stimulated environment which has been found to contribute to the learning process (Fredericks *et al.*, 2006:29). Children thus experience their environment primarily through senses and motor abilities (De Jager, 2009:150). The sensory motor system develops through movement incorporating touch, smell, taste, sight and the hearing senses, also known as “far” senses, as well as the vestibular, proprioceptive and kinaesthetic systems, known as the “near” senses (De Jager, 2009:155). Therefore, the sensory system is responsible for communication between the child and his/her environment (De Jager, 2009:157; Hannaford, 2005:89). Medina (2014:35) states that through physical movement, brain power improves which assists the brain in long-term memory, concentration and problem-solving tasks. In order for the cognitive functions to perform, all the systems in the body need to work continuously together; thus, learning relies on the whole body -- not just the mind (Ratey & Hagerman, 2008:101). Furthermore, an immature brain is highly adaptive and flexible, and for this specific reason it is the ideal opportunity for children to learn and develop their motor ability, because they/children are capable of absorbing a wide variety of experiences at a young age (Thompson, 2008:10). In this regard, research has found that through a range of experiences and repetition, the brain becomes more refined and efficient because of the increase in neural connections in the brain, which leads to enhanced everyday activities, including relevant skills, language and cognition (Thompson, 2008:11). Also, during movement, children need opportunities to participate in coordinated movements using their eyes, ears, hands, feet and core

muscles. These coordinated movements incorporate using both sides of the brain, which increases cognitive functioning (Hannaford, 2005:95). According to Ratey and Hagerman (2009:110) motor skills will stay underdeveloped, when sensory pathways in the brain have not been developed correctly. Appropriate learning experiences and quality learning thus need to be promoted at the right stages of child development, for efficient learning development (NSCDC, 2007:3). Physical development further includes gross motor development, as well as fine motor development which entails using smaller movement skills such as writing, colouring, drawing, threading, picking up objects and tying shoe-laces (Mostafavi *et al*., 2013:23).

Movement also facilitates learning by developing the perceptual-motor ability of spatial awareness, which refers to the awareness of your body in a space, or in relation to an object or objects (Nel *et al*., 2013:60). This aspect is important for letter identification and the orientation of symbols on a page, for example writing between the lines (Nel *et al*., 2013:62). These spatial concepts cannot be taught; they need to be physically experienced through movement (Burn, 2007:50). Children, thus, first need to perceive objects in relation to themselves before they can perceive objects in relation to one another (Nel *et al.*, 2013:75). Movement further develops the perceptual concept of background and foreground, referring to near-point focus and far-point focus, which is important for the child to be able to identify what and when something is in front of him on the board or far from him (Kokot, 2006:42).

Another perceptual ability developed by movement, is the visual ability to focus on a specific point, which is necessary so that it is possible for children to focus on small, static two-dimensional letters on paper, forming an important part of academic learning as the skills for reading, writing, spelling and mathematics depend on the visual system (Ayres & Robbins, 2005:25). Movement also improves other visual skills which include binocular vision (to move the eyes together in coordinated way), which is necessary, for instance, to read across the page, to follow the teacher in the class, to follow a ball and to complete a mathematical sequence (Kokot, 2006:44). The eyes thus become more coordinated when children engage in movement activities (Kokot, 2006:44).

From the above findings one may conclude that movement, which is dependent on and which develops perceptual-motor skills, is essential for cognitive development.

Developing perceptual motor-skills is not just critical or beneficial for academic performance though, as once the child can coordinate their movements in an efficient way, the learning of sport-specific skills can begin.

2.6. The relationship between perceptual–motor skills and sport development

As mentioned above, a child progresses through different stages of motor development (Pienaar, 2012:7). Sport development and the development of sport specific skills are part of the last phase of motor development, ranging from seven to 14 years and older (Donnelly *et al*., 2017:44; Pienaar, 2012:7). The development of mature movement patterns in perceptual-motor skills is essential as it equips children with the fundamental skills for further development in sport and for development into lifelong active adults (Stodden *et al*., 2008:290). In this regard, Westendorp *et al*. (2011:1147) found that children with well-developed perceptual-motor skills engage more comfortably in organised sports activities than children with poorly-developed perceptual-motor skills. Conversely, if the proficiency in perceptual-motor skills is poor, skills may be delayed to in advancing to lifelong physical activity and sport-specific skills (Clark & Metcalfe; 2002:170). A child's lifelong engagement in physical activity is thus enhanced through the development of perceptual-motor skills and the participation in school sports (Bocarro *et al*., 2008:155).

2.7 Summary

The development of motor skills usually entails that a learner moves through four general movement phases, namely the reflexive, rudimentary, fundamental and specialised or sport-related phase which continues into adulthood (Donnelly *et al.*, 2017:38). These phases build upon one another, which implies that if a learner's perceptual-motor skills have not developed well in one phase, the following phases will be affected negatively, indicating the importance of the optimal development of motor skills at different ages.

The literature review further shows that well-developed perceptual-motor skills are associated with physical health, because motor proficiency is needed to participate in regular physical activity, which is associated with a lower incidence of lifestyle-related health conditions such as obesity. Furthermore, perceptual-motor proficiency is critical

for the development of social and emotional skills such as self-image and self-control, as these skills, related to perceptual-motor skills such as body awareness and control, are developed when learners engage in physical activities with other learners. Well-developed perceptual-motor skills are also associated with cognitive development and academic achievement, as cognitive functions, including long- term memory, concentration and problem-solving skills, develop through the senses during physical movement. Lastly, research highlights the role that perceptual-motor skills play in the development of sport skills and in the participation in sport.

The value of optimally-developed perceptual-motor skills, is supported in the prescribed content of Physical Education in the Foundation Phase curriculum in the CAPS, especially in Grade 1 where the focus is on activities which promote locomotor skills, rhythm, coordination, balance, spatial orientation, laterality and other perceptual-motor skills (DBE, 2011:38). In light of this, the nature and effects of quality Physical Education programmes will be discussed in the next chapter.

CHAPTER 3:
The nature and effects of quality Physical Education programmes in the Foundation Phase

3.1. Introduction

In order to determine the nature of quality PE programmes, it is necessary to first do a brief literature review on how PE is implemented in countries where the subject has a relatively strong status. In this regard, the characteristics of PE programmes in the Foundation Phase in Australia, New Zealand, the USA, the United Kingdom (UK) and China will be compared to that of South Africa. Also, the general characteristics of a quality PE programme according to literature studies on the effects of PE programmes in other countries and in South Africa, and challenges facing schools in rural areas in South Africa, will be discussed next.

3.2 PE programmes in the Foundation Phase in other countries and in South Africa

The Australian curriculum for *Health and Physical Education* for 5 and 6 years old and the Foundation year (6-7 years), is similar to the South African curriculum with regard to the following aspects: in the *Movement and physical activity* strand, the main aim is the development of fundamental movement competence and confidence in a variety of physical activities in different contexts (AC, 2019:13). In the *Movement and physical activity* strand, learners are also provided with skills to refine communication, decision-making and self-management skills and to take responsibility for their safety (AC, 2019:8), which is similar to outcomes for PE as stated in the CAPS (DBE, 2011:8). Physical activities are performed individually and in groups (ACARA, 2012:9). The development in the five- to- six year-old age group and in the Foundation year is specific, which focuses on motor and social development, and children participate in physical activities in PE on a weekly basis as a minimum (ACARA, 2012:10). Primary school teachers receive training in all learning areas, including PE, and have to be certified teachers to teach PE (Williams & Pill, 2019:1193).

In New Zealand, PE encourages children to enjoy movement and to develop positive attitudes toward the participation in physical activities, and also to maintain and

enhance relationships, interpersonal skills, social skills and values (NZCO, 2019). To this end, the development of a wide range of basic movement skills is included in the early curriculum (NZCO, 2019). In New Zealand PE also includes traditional heritage activities. The activities of *Rèhia* (recreational, leisure interests and physical activities) develop physical and mental fitness, whereas the *Te reo kori* (a programme used to develop basic movement skills) includes the development of fundamental movement skills (NZCO, 2019). During the PE programme, on-going assessment occurs, which is also part of an effective learning programme according to the curriculum (NZCO, 2019).

The PE programme in the pre-primary school and Grade 1 in the USA is designed to develop motor skills, knowledge about active living, physical fitness, sportsmanship, self-efficacy and emotional intelligence. When children engage in PE, they practise the knowledge and the skills they learn through physical activity (CDC, 2013:8). Children participate in planned, structured and repetitive physical activity for the purpose of improving and maintaining fitness components (CDC, 2013:8). It is recommended that Americans from six-years and older should engage in daily physical activity for 60 minutes or more (USDHHS, 2008:16). Furthermore, PE in the US is governed or led by a national body for PE, *SHAPE America*, which has specific standards for PE programmes and teachers to adhere to, nationally (SHAPE America, 2019).

In the UK, children from their first year of school, receive two PE lessons per week (National Curriculum in England, 2013). The lessons aim to develop fundamental movement skills including agility, balance and coordination of individuals and also collectively with other classmates (National Curriculum in England, 2013). The aim is also to engage children in moderate to vigorous physical activity for 60 minutes each time. Lessons are planned with connections to past and future experiences (National Curriculum in England, 2013).

In the Republic of China, PE is a compulsory part of the curriculum set by the Ministry of Education (MOE) from the first year of primary school until the second year of college (Kajanus, 2016:6). The allocated time for PE in Grade 1 and 2 is four hours per week (Kajanus, 2016:6). The PE curriculum for the pre-primary school as well as Grade 1 and 2, includes fundamental motor skills, athletics, gymnastics, martial arts and traditional sports. Each sport is divided into levels of difficulty, which the children

must complete. During PE, children are required to pass standardised PE tests, in order for them to progress to the next level. The resources and facilities vary between rural and urban schools provided by the MOE (Kajanus, 2016:6).

When looking at PE in the Foundation Phase in South Africa, according to the CAPS (DBE, 2011:10), PE should develop children's physical well-being and knowledge of movement and safety. By developing motor skills, learners will be equipped to participate in different physical activities (DBE, 2011:10). Furthermore, the participation in quality PE not only develops skills, but improves positive attitudes and values that will support children to be physically fit, mentally strong, emotionally balanced and socially well- adjusted (DBE, 2011:8). As discussed in Chapter 2, the development of learners' gross and fine motor skills and their perceptual development is crucial during the Foundation Phase years, and their physical and motor development is essential for children's holistic development. According to the CAPS (DBE, 2011:10) PE in the Foundation Phase focuses on perceptual-motor development, including locomotor skills, rhythm, balance and laterality, and also sports-related activities for participation in specific sports later on (DBE, 2011:9). The CAPS (DBE, 2011:11) allows two hours for PE per week in a five-day cycle. During PE, assessments take place individually, in groups and during free play and structured activities, which allows for monitoring and tracking the child's progress throughout the term (DBE, 2011:66).

From the above, it can be concluded that in countries where PE has a relatively strong status, a structured, goal-orientated programme is followed, that all have similar objectives, which are to promote children's physical, psychological, social development and positive attitudes towards lifelong physical activity. In South Africa, where PE does not have such a strong status (Stroebel *et al.*, 2019:1), the curriculum concurs with the characteristics of the PE programmes in the above countries, although research shows that the programme is not consistently implemented according to the prescriptions of the curriculum (Du Toit, 2019:13; Stroebel *et al.*, 2019:1; Van Deventer, 2009:147). Also, in contrast to South Africa, in some countries a national body monitors the quality of PE programmes and teachers have to be qualified in PE to teach the subject.

Other characteristics of a quality PE programme, as described in literature, will be discussed next.

3.3 The characteristics of quality PE

The United Nations Educational, Scientific and Cultural Organization (UNESCO) provides an international definition of quality PE, namely “the planned, progressive, inclusive learning experience that forms part of the curriculum in early years, as well as in primary and secondary education” (UNESCO, 2014:9). According to Chen *et al.* (2016: 231), quality PE offers a wide range of physical activities that are developmentally appropriate and meaningful for learners, while using appropriate instructional practices to provide learners with maximum learning experiences and productive learning environments. These researchers (Chen *et al*., 2016:231) further agree with other authors (Ball & Forzani, 2009:497; SHAPE America, 2019) that the implementation of quality PE in practice consists of four essential dimensions, including task design (curriculum), task presentation (implementation of the curriculum), class management and instructional guidance. The last two dimensions are dependent on qualified and trained PE teachers, since the way the teacher enacts the four essential dimensions in a lesson collectively, contributes to the quality of instructional practices (Chen *et al*., 2016:231). In support of these dimensions, Williams and Pill (2019:1194) state that the curriculum, how it is taught, and how it is assessed, are the three central messaging systems of quality PE.

Furthermore, researchers (Kelly *et al*., 2019:697; Williams & Pill, 2019:1195) and organisations (ICSSPE, 2019; SHAPE America, 2019; UNESCO, 2017) have identified certain key principles which high-light characteristics of a quality Physical Education programme namely, among others: the recommendation of a weekly time-allocation for PE of 120 minutes, qualified teaching personnel with the knowledge and the expertise to develop physical literacy among learners, PE teachers who teach and mentor non-specialist practitioners, the access to adequate teaching material and resources which are safe and accessible to PE teachers and children, and evaluation to monitor strengths and weaknesses of PE programmes.

Although the national school curriculums of many developing countries include these key principles, several challenges to implement a quality PE programme have been documented in research studies (Kelly *et al*., 2019:697; Williams & Pill, 2019:1195), especially in developing countries and in rural areas (Du Toit, 2019:13; Stroebel *et al*., 2019:2). According to Van Deventer (2015:13) and Stroebel *et al*. (2019:3), the

presentation of PE in rural areas, often lacks quality and quantity (thus it is not presented as often as it should in accordance with the CAPS prescribed time per week, and it is not presented by qualified PE teachers). In this regard, schools in rural areas often face more pronounced challenges in comparison to schools in urban areas. These challenges will be investigated further.

3.4 Challenges facing schools in rural areas regarding the implementation of PE

In rural areas, studies found that adolescents from disadvantaged backgrounds are less likely to participate in physical activities than those from higher socio-economic backgrounds (Hallal *et al*., 2012:247). A study done in the UK also found that teachers' needs to be more informed and educated about PE, are more prominent in rural areas (Williams, 2008:19). Morgan and Hansen (2008:506) state that one of the biggest challenges regarding the implementation of PE in schools in rural areas, are teachers that are not qualified sufficiently to teach fundamental movement skills in the Foundation Phase.

Another challenge in lower socio-economic school environments, according to Evans and Davies (2008:199), is social class. Children often regard themselves as less valued and judged by their class, and this affects their participation levels in physical activity (Evans & Davies, 2008:199). Reay *et al*. (2007:1041) point out that parental support is often less in low socio-economic classes compared to that of middle-class parents, where parents regard it as their duty to support their children.

Dumas and Laberge (2005:184) also state that living in rural and low socio-economic environments, contributes to bad health status as children in rural areas are less physically active and have higher rates of overweight and obesity. Rural areas are more obesogenic than urban areas, and these obesogenic environments impact negatively on healthy eating and physical activity levels (Bronfenbrenner *et al*., 2007:58). In this regard, in New York in the USA, a study was done by Demment *et al*. (2015:100) to determine the influence of a nutrition and physical activity intervention among 281 children, between 6th and 8th grade in rural areas. They showed that higher levels of physical activity decreased the children's body mass index in the low socio-economic class environment (Demment *et al*., 2015:100). Conversely, some learners who come from lower socio-economic backgrounds, often come to school hungry,

which leads to fatigue and low levels of motivation to participate in physical activities in PE (Barnard *et al*., 2014:6). In support of this statement, Muller *et al*. (2019) point out that a low socio-economic environment can put a learner at risk of malnutrition, which is associated with poor cognitive development, concentration and motor skills, which in turn can negatively influence their motivation to participate in PE.

Ellison and Woods (2019:1111) further indicate that PE is often more marginalised in schools in rural areas of low socio-economic status than schools of more affluent socio-economic status, because these schools are often poorly funded and suffer from a high teacher turnover. According to these researchers, one of the biggest challenges with which schools in low socio-economic areas are tasked, is retaining qualified teachers as such teachers often search for job opportunities with better working conditions (Ellison & Woods, 2019:1111). Research shows that a lack of teachers who are qualified and trained to teach PE, is also a challenge to the implementation of quality PE in rural areas in South Africa (Stroebel *et al.*, 2019:2). Reithmuller *et al*. (2009:124) emphasise the importance of schools appointing more teachers who are qualified to teach PE and who can be involved in improving PE standards, but specifically fundamental movement skills in the pre-school stage.

Another aspect that leads to challenges to implement quality PE programmes in schools in low socio-economic areas, is that teachers often do not have access to sufficient and suitable resources for PE (Michael *et al*., 2019:494). In more socio-economically deprived environments, teachers can be taught how to use recycled materials to make equipment for PE lessons and perceptual motor-skills (Erasmus *et al*., 2015:596). In many rural schools, PE teachers also face the barrier of a lack of space to teach what is required of them according to the curriculum (Barnard *et al*., 2014:5). Furthermore, because of a lack of transportation to schools provided by public services, learners from low-income backgrounds often don't participate in after-school physical activities, which can lead to lower levels of learner motivation to participate in PE (Demment *et al*., 2015:105). Schools in rural areas also often reduce the time allocated to PE, which means that children spend the majority of the day in the classroom and do not reach the outcomes set in the PE curriculum (Gouws, 2015:1355).

In light of challenges such as the ones discussed above, the effects of various school-based PE and physical activity intervention programmes to counter these problems, have been investigated.

3.5 Studies on the effects of PE and physical activity intervention programmes in schools in other countries

In Canada, a *Sportball Programme* was implemented in the PE programme of specific pre-schools, to determine the effect of the sports programme on gross motor-skills among 27 learners at the ages of three to six years. Results showed that learners who participated in the eight-week intervention programme, significantly improved their gross motor skills, in accordance with other studies that suggest that motor skills improved during motor-skill intervention programmes in pre-schools (Favazza *et al*., 2013;235).

In Sarayan (Iran), an eight-week aerobic programme was implemented to determine its effect on learners' cognitive development (Hosseine, 2006:215). The intervention programme involved 45 eight-year old female learners and included three sessions per week of 45 minutes in duration. The results showed that the learners who participated in the aerobic programme, showed improved aerobic endurance, motor skills and cognitive function (Hosseini, 2006:215).

In Sweden researchers did a study on the effect of increased PE on motor skills and school performance (Ericsson, 2014:273). The programme included 129 seven to nine year-old children. The programme consisted of five daily sessions which lasted 45 minutes, and an extra session of 60 minutes' motor training was included in a week. The results showed that the physical activity programme led to a significant improvement in motor skills and academic achievements. These results also supported studies that suggest that PE improves cognitive achievements (Aberg *et al*., 2009:106).

In the study of Van Capelle *et al*. (2017:658) in Sydney, Australia, a 21-week physical activity intervention programme, with 30 minutes' activities three times per week focusing on fundamental movement skills, was implemented among 4255 preschoolers (aged three to five years). The results showed that most of the pre-schoolers' fundamental movement skills had improved significantly after the programme.

A total of 230 eight- to- 11 year-old learners also benefited from a well-structured PE intervention programme in Rome, Italy (Gallotta *et al.*, 2017:1547). The programme, which included two sessions per week of 60 minutes each for five months, significantly improved their motor skills and cardio-respiratory fitness (Gallotta *et al*., 2017:1547).

Some physical activity intervention programmes have been implemented in South Africa as well, which will be discussed next.

3.6 Studies on the effects of physical activity intervention programmes in schools in South Africa

In a study in Stellenbosch, South Africa, Barnard *et al*. (2014:14) implemented two intervention programmes among 149 Grade 2-learners over a period of eight weeks. The objectives were the effect of integrated academic skills and physical development programme, and a moderately intensive physical activity programme, on the participants' academic achievements. During this programme, activities to develop various perceptual-motor skills (balance, bilateral coordination, body awareness and spatial orientation) were included, as well as stretching exercises, cardiovascular and cooling-down activities. The results showed significant improvements in the participants' perceptual-motor skills and improvements in the learners' literacy and numeracy skills, although the latter was not statistically significant (Barnard *et al*., 2014:14). The researchers concluded from the results that movement and physical activity play an important part in learners' cognitive development, specifically the improvement of spelling and mathematical skills (Barnard *et al*., 2014:14).

In Potchefstroom in the North-West Province, a perceptual-motor intervention programme was implemented among 21 Grade R-children over a period of 10-weeks, consisting of three 40 minute sessions per week, to determine its effect on their school readiness (Erasmus *et al*., 2015:596). The programme included perceptual skills, spatial orientation and midline-crossing activities to promote visual and auditory discrimination. According to the authors, the results confirm existing literature that a perceptual-motor intervention programme can contribute towards the prevention of learning problems (Erasmus *et al*., 2016:596). The study showed that the perceptual-motor intervention programme had a positive effect on the learners' school readiness and that it can make a difference in learner development.

In the study of Gouws (2015:1355), an eight-week kinderkinetics programme (focusing on gross and perceptual motor activities) was implemented among 24 six-to-eight year-old learners in Northern Kwazulu-Natal, and the results showed relative improvement in scholastic performance and motor proficiency. There was also a significant correlation between motor proficiency scores and scholastic performance of children in the experimental group (Gouws, 2015:1358).

From the literature review it is clear that the effects of physical activity intervention programmes on young learners' motor skills are generally positive. However, since studies on the effect of quality PE programmes in South Africa, especially among schools in rural areas, are lacking, this study is therefore focusing on the effect of a quality Foundation Phase PE programme implemented in a rural school.

CHAPTER 4:
Methodology

4.1 Introduction

In this chapter, the methodology of the research, including the research design, the theoretical background, the selection of participants, measuring instruments, data collection procedure, the Physical Education intervention programme, data analysis and ethical aspects, are discussed in more detail.

4.2 Research design

A research design is seen as the blueprint of how researchers plan to conduct their research (Maree, 2011:144; Mouton, 2001:55). According to Babbie (2007:112), a research design can be defined as a process of focusing the researcher on the purpose of a particular study. Researchers, namely Monette *et al*. (2008:9) and Pruzan (2016:188), define the research design as a plan outlining how observation will be made and how the project will be carried out. This study entails quantitative research, where the study relies on numerical data to determine the relationships or differences between variables (Kei & Harland, 2018:21; Suter, 2006:464). Quantitative research is also defined as a process that is systematic and objective, by using numerical data from only a selected group to generalise the findings to the group that is being studied (Kei & Harland, 2018:21; Maree, 2011:145). The researcher in a quantitative study tests theories about reality, investigates for a cause and effect, and uses quantitative measures to gather data to test the hypothesis (Kei & Harland, 2018:21). Relations between the variables are often tested by the researcher to determine the magnitude and frequency of relationships. Examples of research studies that outline quantitative research would be experiments or surveys, implying that quantitative studies are either experimental or descriptive (Maree, 2011:257; Pruzan, 2016:188). A descriptive study often establishes associations between variables, whereas an experimental study establishes probable causality (Maree, 2011:257). The quantitative researcher generally uses a large sample size which is selected randomly, or a convenience sample from individuals who are available and willing to participate in the study (Kei &

Harland, 2018:29; Maree, 2011:257). In a quantitative research approach, the data is usually collected with existing, pilot-tested or self-developed instruments intended to produce reliable results and scores. The data is prepared for analysis and afterwards interpreted by initial predictions and prior research on the same topic (Maree, 2011:258; Pruzan, 2016:191). In this study the perceptual-motor skills of the participants were tested before and after the implementation of the PE programme, therefore the study makes use of a pre- and post-test design (Bruce *et al*., 2018:332; De Vos, 2011:62).

4.3 Theoretical perspective

This study was conducted within a positivistic approach. Denscombe (2008:14) defines positivism as a perspective that is used for social research that applies the natural science model of research to investigations of social phenomena and explanations of the social world. Kei and Harland (2018:69) agree with this statement, adding that positivism holds that true scientific findings can only be based on empirical observations and inferences that can be made in a logical way from these observations. It can be concluded from statements of Glicken (2003:20), Kei & Harland (2018:69), De Vos (2011:6) and Leedy & Ormrod (2019:132) that positivism firstly entails a belief that the methods and procedures of the natural sciences are appropriate to the social sciences. Secondly, it entails a belief that only those phenomena that are observable, in the sense of being perceivable by the senses, can validly be warranted as knowledge (De Vos, 2011:6; Kei & Harland, 2018:69; Leedy & Ormrod, 2019:132). Positivism also suggests that scientific knowledge can appear through the collection of verified facts (Bryman, 2000:15; Kei & Harland, 2018:69). Lastly, positivism is a research philosophy that is known for its objectivity that is based on independent variables (Ary *et al*., 2010:3). Positivism entails that it is essential for the researcher to follow a distant, detached and neutral approach with a non-interactive position (Leedy & Ormrod, 2019:133; Morris, 2006:3). Positivists thus believe that knowledge can be revealed or discovered through the use of the scientific method. This provides explanations of causes to people's intentions, and within this approach, experimentation, observation, control, measurement, reliability and validity are emphasised in the research process (Maree, 2011:55).

In this study numerical data are used to determine the effect of the programme on the variables of the study, and to prove or reject the set hypotheses, therefore it is grounded in the principles of positivism.

4.4 Selection of participants

This study was conducted in a primary school in Qua-Qua, which is a low socio-economic rural environment in the Free State, where, before the intervention programme, PE was not formally presented by any teachers who had any training in PE. At the beginning of the year, the Grade 1's of the participating school were divided randomly into four classes, of between 25 and 28 learners each; all between the ages of six and eight years old. The participants that were used for the experimental group for the study were the first three classes of the Grade 1learners on the list of classes, totalling 78 learners, constituting a convenience sample. Maree (2011:172) defines a sample as a way to learn about a population, which is valid and results specifically for the population. According to Maree (2011:177) convenience sampling refers to when participants are selected based on that they are easily and conveniently available.

The remaining Grade 1 class of 25 learners, was chosen conveniently as the control group. The control group's age and circumstances were therefore similar to those in the experimental group, except for a PE programme that was not presented by a specialist PE teacher.

The following inclusion and exclusion criteria were used to include learners in the experimental and control groups.

4.4.1. Inclusion and exclusion criteria for the participants

4.4.1.1 Inclusion and exclusion criteria for the experimental group:

Learners were selected for the experimental group if they:

- were in the first three classes of Grade 1's on the list of the school
- were between six and eight years old;
- participated in 80% of the PE classes;
- provided signed permission forms for participation from parents / guardians; and

- provided verbal assent to participate in PE programme, in the presence of an independent witness.

Learners were excluded from the experimental group if they:

- were in Grade 1 older that eight years;
- did not participate in 80% of the PE classes;
- did not provide signed permission forms to participate from parents/guardians; and
- did not provide verbal assent in the presence of an independent witness.

Learners who did not meet the above inclusion criteria or who were excluded due to the exclusion criteria, still participated in the PE programme, but their data was not used for the study.

4.4.1.2 Inclusion and exclusion criteria for the control group:

Learners were selected for the control group if they:

- were in the fourth Grade 1 class on the school's list;
- were between six and eight years old;
- provided signed permission forms for participation of the control group from parents / guardians; and
- provided verbal assent to participate as part of the control group, in the presence of an independent witness;

Learners were excluded from the control group if they:

- were in Grade 1 but older than eight years;
- did not provide signed permission forms for participation of the control group from parents / guardians; and
- did not provide verbal assent to participate as part of the control group, in the presence of an independent witness.

In order to control for possible differences between the experimental and control groups, the Chi-square test of independence with Cramer's V, was conducted. Table 4.1 shows the demographic information of the learners that were used as experimental and control groups in the study, as well as the results of the Chi-square test.

Table 4.1: Demographic characteristics of participants and results of the Chi-square test

	Age			Gender	
	6	**7**	**8**	**F**	**M**
Total group (N = 103)	3 (2.9%)	91 (88.3%)	9 (8.7%)	46 (44.7%)	57 (55.3%)
Experimental group (n = 78)	2	68	8	34	44
Control group (n = 25)	1	23	1	12	13
Chi-Square p-value	0.360			0.699	
Cramer's V	0.094			0.038	

Note: N = number; F = female; M = male. Cramer's V of 0.1 is small; 0.3 medium; 0.5 large

Table 4.1 shows that the Chi-Square p-value is 0.360 and the Cramer's V-value for age is 0.940, whereas the Chi-Square p-value for gender is 0.699 and the Cramer's V-value for gender is 0.038. These values show that there were no significant differences (of statistical or practical significance) between the experimental and control groups regarding age and gender, before the onset of the intervention programme.

As promised to the parents or guardians of learners in the control group in the informed consent letters, and so that they would not be disadvantaged by being in the control group, the control group received the 10-week PE programme from the specialist PE teacher after the completion of the intervention programme and the post-tests.

4.5 Measuring instruments

The perceptual-motor skills of the learners from the experimental and control groups were assessed by the researcher before and after the PE intervention programme. The perceptual-motor tests were a collection of tests from standardised motor skill and motor proficiency test batteries (Bruininks & Bruininks, 2005; Donnelly *et al.,* 2017; Frankenburg *et al.*, 1996; Henderson *et al*., 2007; Gallahue & Ozmun, 2006; Mutti *et al.*, 2012. Ulrich, 2015). Du Toit (2002:23) used this selection of tests in her study to test the gross-motor and perceptual–motor skills of Foundation Phase learners. The perceptual-motor skills from these test batteries that were tested were hopping,

skipping, one-leg balance, balance walk, catching and kicking. These skills are selected for three reasons:

1) These skills represents the three categories of movement, namely basic locomotion (standing long jump, hopping and skipping), balance (one leg balance and balance walk), and manipulation (throwing and catching) (Donnelly *et al*., 2017:12);

2) these skills are used extensively in established and standardised motor test batteries for children in the Foundation Phase (Bruininks & Bruininks, 2005; Frankenburg *et al*., 1996; Henderson *et al*., 2007; Mutti *et al*., 2012; Ulrich, 2015); and

3) these perceptual-motor skills are suitable to use in the form of an assessment test in a Physical Education programme because of their simplicity and compatibility with the type of activities used in Physical Education in the Foundation Phase.

The “finger-to-nose” test (Muti *et al*., 2012:34) was additionally used to test body and spatial awareness.

The perceptual-motor tests included the following procedures:

Hopping (Ulrich, 2015; Frankenburg *et al*., 1996). The test entails two trials of hopping forward on each leg up to a maximum of 10 hops. The highest score was taken.
Skipping (Mutti *et al.*, 2012). The skipping movement (step, hop, step, hop) was demonstrated by the researcher and then the learner performed the skipping movement. The number of skipping steps done correctly, to a maximum of four, was taken as the score.
One leg balance (Bruininks & Bruininks, 2005; Frankenburg *et al.*, 1996; Henderson *et al.,* 2007; Mutti *et al.,* 1998). The test entails two trials of balancing on each foot, up to a maximum of 10 seconds, with the arms hanging by the sides. The learner was instructed by the researcher to stand with the free leg bent backwards at the knee and kept off the floor. Swaying was allowed, and the arms were allowed to move from the sides. Balancing was tested on both legs (alternatively), and the better of the two trials taken as the score.

Balance walk (Bruininks & Bruininks, 2005; Henderson *et al.,* 2007; Mutti *et al.*, 2012). The participants are asked to walk heel-to-toe on a low balance beam (2.5 m. long, 100 mm. wide and 300 mm. high), and then walk heel-to-toe backward on the beam. The score was the distance correctly placed heel-to-toe up to a maximum of 1.5 m. Two trials were allowed.

Catching (Ulrich, 2015; Folio & Fewell, 2000; Henderson *et al.,* 2007). The test measures the learners' ability to catch an aerial, underhand thrown netball ball (20 cm in diameter), with two hands in front of the body. The thrower stood two meters away from the participant. The score was the number of correct catches off five throws.

Ball kick (drop and kick) This test measures the participant's kicking ability of a soccer ball. The researcher demonstrated the kicking technique first. The ball had to be held above the ground and when the ball is released from the hands, it must be kicked before striking the ground, showing correct timing and rhythm. The score was the number of correct kicks off three attempts.

The finger-to-nose test (Bruininks & Bruininks, 2005; Mutti *et al*., 2012) is used to test body and spatial awareness it also tests the child's motor planning and motor control. The participant holds her/his arms stretched out to the side, at shoulder height, the researcher asks the learner to touch his/her nose with their index finger. The learner then has to close his/her eyes and reach back and forth three times.

All efforts were made by the researcher to conduct the tests accurately and exactly according to the instructions of each test.

4.6 Data collection procedure

The perceptual-motor tests were conducted with the experimental and control groups before the onset of the PE programme. The experimental group of learners participated in the PE programme presented by the specialist once a week for 10 weeks, after they completed the tests, while the control group continued with their usual school programme. The second (post-) set of perceptual-motor tests were done with the experimental and control group after the experimental group completed the PE programme. The tests were conducted within school time (in the time allocated for PE according to the prescriptions of the curriculum) on the school grounds, in an open grassy area. The learners were grouped in small groups for the tests, but were tested individually.

4.7 The Physical Education programme

The PE programme (Addendum L) was presented on the school grounds, during school hours (in the time allocated for PE according to the prescriptions of the curriculum). The programme consisted of a one-hour lesson once a week, over a 10-week period. The group of participants were divided into their three classes that each participated in the programme once a week. The programme was presented by the researcher, who is a teacher with a BEd Honours degree specialising in Physical Education. The activities in the PE programme were compiled within the guidelines for PE in the CAPS document (DBE, 2011). Each lesson included a warm-up, which included locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a close-by colour, shape or pattern. The main part of the lesson consisted of different fundamental movement skills from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). These activities were presented in station format. Each lesson ended with a game and an appropriate cooling-down activity, for example stretching activities. The programme also included certain elements like rhythm and target games. Some improvised equipment was made from scrap material to use in the programme, like hurdles, coloured shapes, bean bags, cones, target boards and balance apparatus.

4.8 Data-analysis

The results of the experimental and- control group were compared and analysed by the Statistical Services of the North-West University, using the IBM SPSS (SPSS, 2018) computer programme for descriptive statistics, namely mean values, standard deviations, and minimum and maximum values, and inferential statistics, including t-tests and ANCOVA. Statistical significance is evaluated at a 5% level. For the examination of the practical significance of differences, the standardised difference between means, effect sizes (ES), called Cohen's *d*, were calculated for the interpretation of differences between the study groups and also the before and after scores of the PE programme as recommended by Cohen (1988) and Steyn (2006). For the interpretation of differences, the guidelines proposed by Cohen (1988) and Steyn (2006) entailed that an ES of 0.2 represents a small effect, close to 0.5 a

medium effect and close to 0.8 or larger a large effect. Still, p-values yielded by the independent and dependent t-tests are reported for completeness sake as if random sampling were done. Independent t-tests were used for the pre-tests and paired t-tests within the groups over time, and an ANCOVA which corrected for pre-tests, were used for the post-tests.

4.9 Ethical aspects

Ethical aspects are important to consider in a research study in order to ensure the welfare of participants (Sarantakos, 2013:17). Ethical aspects that were emphasised in this study, were ethical approval, permission from the school, informed consent and assent, anonymity, confidentiality and safety measures in the PE programme.

4.9.1 Obtaining ethical approval and permission from the school

This study was approved by the Education, Management, and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (NWU-EMELTEN-REC) (NWU-00530-19-A2) of the North-West University. The study is classified as high risk for ethical purposes as minors are part of the study, even though PE is compulsory in the Foundation phase within the curriculum of Life Skills as prescribed in the CAPS (DBE, 2011:10).

4.9.2 Informed consent and assent

Before the commencement of the study, an information briefing was held at a parents' meeting, where parents were informed about the PE programme by an independent person (a teacher from the Senior Phase at the school) who could speak English as well as the parents' home language. This meeting took place at the school, together with the researcher and the principal. The session included an explanation of the risks and benefits of allowing their children to participate in the study, and the parents' questions were answered by the researcher. After the information session the parents were given the permission forms (Addendum A and B) to take home and read through before signing and sending them back to school.

After the parents' permission had been obtained, the independent teacher explained the study to each Grade 1 learner by using pictures as shown in Addendum J, asking

the learner if he or she would give verbal assent after the explanation. A witness declaration form (Addendum E) was signed by the independent teacher if the learner gave verbal assent. The same procedures were followed with regard to the learners of the control group, by the same independent teacher. Before the implementation of the PE programme, the school management, including the principal (Addenda C) and the chair of the school governing body (Addenda G) were also asked for permission and approval to present the programme.

4.9.3 Anonymity and confidentiality

In the analysis of the data and in the reporting of the results, the data were kept anonymous and confidential, and only after the completion of the study the results of each individual learner were provided to and discussed with the parents of that learner. The parents could then discuss the results with the learners' teacher if they wanted to. After the completion of the study, a feedback meeting was also held at the school by the researcher, and here group feedback was provided to the parents on the results of the study, and some exercises were demonstrated which the parents could do at home to improve their child's perceptual-motor skills.

The results of the study are confidential and are stored on the study leader's computer protected by a password. Hard copies are in safe keeping, locked in cupboards in the study leader's office, who is the only person that can access it. After seven years all the data will be destroyed, and the findings will not be used for future studies.

4.9.4 Safety measures during the PE programme

Safety measures were taken to ensure that no learner was harmed, physically and emotionally during the learners' participation in the PE programme. The researcher ensured to allow enough time to rest, always to communicate with the learners, provide clear instructions, an open, clean and safe space and to challenge learners with new movements according to their progress. While the learners were being tested, the teacher provided activities for the learners that were not being tested, to do at their own stations. There was always a possibility for an injury to occur during a PE lesson, but the researcher was well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she was trained in First Aid in case an injury should occur. There was always a First-Aid kit available during lessons.

Participation was voluntary, which meant that a learner could withdraw from the study at any time.

After the completion of the programme each learner received a certificate of participation (Addendum K), during a school assembly. The 10-week PE programme was presented to the control group after the study, so that they were not disadvantaged by being in the control group. Training was also presented to the teachers of both the experimental and control groups after the study, to be able to present the PE programme to learners after the study.

Following, the results are presented and discussed in Chapter 5.

CHAPTER 5:
Results and discussion

5.1 Introduction

In this chapter the data of the quantitative research are discussed, by interpreting the results of the perceptual-motor skills tests before and after the intervention programme. The aim of the study was to determine the effect of a Physical Education (PE) programme on the perceptual-motor skills of Grade 1-learners. As stated before, the data of the pre- and post-tests were compared using dependent and independent t-tests and ANCOVA, to determine whether the PE programme had a statistically significant effect. Effect sizes (ES) were also calculated for the interpretation of differences of practical significance. The results will now be discussed in detail.

5.2 Results

For the purpose of the secondary aim of the study, namely to determine the levels of perceptual-motor skills of the Grade 1-learners in comparison with age norms before the commencement of the PE programme, it was necessary to first look at the age norms for these perceptual-motor skill tests. These age norms represent the average value that a learner can usually attain at this age, were derived from several well-known standardised perceptual-motor skill test batteries (Bruininks & Bruininks, 2005; Frankenburg *et al*., 1996; Henderson *et al*., 2007; Gallahue & Ozmun, 2006; Mutti *et al*., 2012; Ulrich, 2015) and are shown in Table 5.1.

Table 5.1 Average norms and criteria for gross motor and perceptual motor skills in six to seven year-old children

Balance-walk (meters)	One- leg hop (number)	Skip (number)	One- leg balance (seconds)	Catching (number)	Ball-kicking (number)	Finger- to -nose (number of correct touches)
1.5 *(1,3,5)*	10 *(2,6)*	4 *(5)*	10 (*1,2, 3,5*)	5 *(3,4,6)*	3 *(1)*	3 *(5,6)*

Note: 1 = Bruininks & Bruininks, 2005; 2 = Frankenburg et al., 1996; 3 = Henderson et al., 2007; 4 = Folio & Fewell, 2005; 5 = Mutti et al., 2012; 6 = Ulrich, 2015.

The results of the descriptive statistical analysis of the total group, experimental and control groups, before the start of intervention programme are shown in Tables 5.2 and 5.3.

Table 5.2 Descriptive statistics of the perceptual-motor test results of the total group, before the onset of the PE programme

Test (norm)	*N*	M	Min	Max	SD
One leg balance L (10 seconds)	103	9.27	2	10	1.52
One leg balance R (10 seconds)	103	8.98	3	10	1.22
Balance walk forward (1.5 m)	103	1.27	0	1.5	0.5
Balance walk backward (1.5 m)	103	1.1	0	1.5	0.57
Hopping L (10 times)	103	9.63	1	10	1.42
Hopping R (10 times))	103	9.82	2	10	1
Skipping (4 times)	103	1.91	0	4	1.43
Ball catching (5 times)	103	3.8	0	5	1.18
Ball kicking (3 times)	103	1.57	0	3	1.17
Finger-to-nose (3 times)	103	1.86	0	4	1.33

Note: M = mean, Min = minimum value, Max = maximum value, SD = standard deviation.

The above results (Table 5.2) show that the scores of the total group for the balance walk forward, balance walk backwards, one leg balance left, one leg balance right and hopping tests, were up to standard when compared to that of the average age norms. The scores for the skipping (M = 1.91), catching (M = 3.8), ball kicking (M = 1.57) and the finger-to-nose (M = 1.86) tests for the total group were below average when compared to that of the average age norms.

Table 5.3 shows the descriptive statistics of the experimental and control groups, as well as the results of the independent t-test before the onset of the PE programme.

Table 5.3 Descriptive statistics and independent t-test results pertaining to the experimental (*n* = 78) and control (*n* = 25) groups before the start of the PE programme

Test (norm)	Mean		*SD*		p	ES
	E	C	E	C		
One leg balance L (10 seconds)	9.12	9.68	1.67	0.9	0.043*	0.32∞
One leg balance R (10 seconds)	8.93	9.04	1.61	1.9	0.862	0.04
Balance walk forward (1.5 m)	1.16	1.38	0.61	0.36	0.024*	0.38∞
Balance walk backward (1.5 m)	1.04	1.32	0.62	0.33	0.005*	0.45∞
Hopping L (10 times)	9.53	9.88	1.62	0.33	0.091	0.21
Hopping R (10 times)	9.76	9.98	1.16	0.06	0.080	0.20
Skipping (4 times)	1.94	1.84	1.37	1.62	0.794	0.06
Ball catching (5 times)	3.68	4.20	1.26	0.76	0.015*	0.41∞
Ball kicking (3 times)	1.65	1.32	1.09	1.35	0.275	0.24
Finger-to-nose (3 times)	1.90	1.76	1.36	1.23	0.643	0.10

*Note: L = left, R = right, E = experimental group, C = control group, SD = standard deviation, * = statistically significant where p < 0.05; ES = effect size, where close to 0.2 indicates small effect, 0.5 a medium effect and 0.8 a large effect, and ∞ indicates medium effect size.*

It can be noted in Table 5.3, that the average scores of both the experimental and the control group for the balance walk forward, the balance walk backward, skipping, ball catching, ball kicking and the finger-to-nose tests, were below average when compared to the average age norms indicated in Table 5.1.

It is also interesting to note that the control group's scores were higher than those of the experimental group, showing differences of statistical ($p<0.05$) and practical significance (of a small to medium effect), in the tests of the one leg balance on the left leg (control group M = 9.68 seconds; experimental group M = 9.12 seconds), the balance walk forward (control group M = 1.38 meter; experimental group M = 1.16 meter) and backward (control group M = 1.32 meter; experimental group M = 1.04 meter), and ball catching (control group M = 4.20 times; experimental group M = 3.68 times). In the tests of hopping on the left leg (control group M = 9.88 times; experimental group M = 9.53 times) and hopping on the right leg (control group M =

9.98 times; experimental group M = 9.76 times), the control group's scores were also higher than the experimental group's scores, but not significantly significant. The experimental group's scores in the skipping test (experimental group M = 1.94 times; control group M = 1.84 times), kicking (experimental group M = 1.65 times; control group M = 1.32 times) and the finger-to-nose-test (experimental group M = 1.90 times; control group M = 1.76 times), appear to be slightly higher than those of the control group, but none of these differences was significant.

In Table 5.4, the results of the paired t-tests showing differences between the first and second tests (intra-differences) in the experimental group, can be seen.

As indicated in the above table (Table 5.4), within the experimental group, most of the average test scores of the second test were statistically higher than the scores from the first tests, except for those on one leg balance left, one leg balance right, hopping on the right and left leg and finger-to-nose test. With regard to the significance of these higher scores, the p-values and effect sizes regarding the balance walk forward ($p = <0.001$ and $ES = 0.44$) and the balance walk backward ($p = <0.001$ and $ES = 0.47$), indicate improvements in these skills in the experimental group, which is of statistical and practical significance (medium effect). Also, the p-values and effect sizes regarding skipping ($p = 0.005$ and $ES = 0.35$), catching ($p = 0.003$ and $ES = 0.40$), and kicking ($p = 0.002$ and $ES = 0.40$) indicate improvements of statistical and practical significance (of medium effect) in these tests.

Table 5.4: Results of the paired t-tests showing differences between the first and second tests (intra-differences) in the experimental group (*n* = 78)

Test	Test number	M	*SD*	p	ES
One leg balance left	1	9.12	1.68		
	2	9.17	1.84	0.853	0.03
One leg balance right	1	8.93	2.08		
	2	9.23	1.67	0.345	0.14
Balance walk forward	1	1.16	0.60		
	2	1.42	0.21	<0.001*	0.44∞
Balance walk backward	1	1.04	0.61		
	2	1.33	0.32	<0.001*	0.47∞
Hopping left	1	9.53	1.64		
	2	9.47	1.34	0.717	-0.04
Hopping right	1	9.76	1.17		
	2	9.68	1.12	0.042	-0.14
Skipping	1	1.96	1.37		
	2	2.44	1.53	0.005*	0.35∞
Catching	1	3.67	1.27		
	2	4.17	0.97	0.003*	0.40∞
Ball kicking	1	1.64	1.10		
	2	2.09	1.08	0.002*	0.41∞
Finger-to-nose test	1	1.89	1.37		
	2	2.11	1.16	0.228	0.16

*Note: M = mean, SD = standard deviation, * = statistically significant where p ≤ 0.05; ES = Effect size, where close to 0.2 indicates a small effect, 0.5 a medium effect and 0.8 a large* effect and ∞ *indicates a medium effect.*

Table 5.5 shows the results of the paired t-tests showing differences between the first and second tests (intra-differences) in the control group. As indicated in this table (Table 5.5), the average test scores from the second test were mostly lower than the test scores from the first test in the tests of the one-leg balance on the left and the right

leg, the balance-walk forward and backward, and hopping on the left and the right leg. Although none of these intra-differences were significant, a number of these deteriorations were of medium practical significance in the control group. Also skipping, catching and ball- kicking improved with medium effect in the control group.

Table 5.5: Results of the paired t-tests showing differences between the first and second tests (intra-differences) in the control group (*n* = 25)

Test	Test nr	M	*SD*	p	ES
One leg balance left	1	9.68	0.90		
	2	9.16	1.75	0.229	-0.58∞
One leg balance right	1	9.04	1.93		
	2	9.24	1.67	0.674	0.10
Balance walk forward	1	1.38	0.36		
	2	1.24	0.47	0.168	-0.38∞
Balance walk backward	1	1.32	0.33		
	2	1.20	0.42	0.355	-0.34
Hopping left	1	9.88	0.33		
	2	9.60	0.76	0.129	-0.84∞
Hopping right	1	9.98	0.06		
	2	9.76	0.59	0.056	-0.40∞
Skipping	1	1.84	1.63		
	2	2.52	1.56	0.250	0.42∞
Catching	1	4.20	0.76		
	2	4.48	0.59	0.166	0.37∞
Ball- kicking	1	1.32	1.35		
	2	1.84	1.31	0.283	0.39∞
Finger-to-nose test	1	1.76	1.23		
		2.04	0.79	0.317	0.23

Note: M = mean, SD = standard deviation, p = statistically significant where p ≤ 0.05; ES = Effect size, where close to 0.2 indicates practical significance of a small effect, 0.5 a medium effect and 0.8 a large effect, and ∞ indicates a medium effect.

In Table 5.6, which shows the results of the ANCOVA taking the pre-test scores into account, it can be seen that the average test scores in the balance walk forward and backward of the experimental and the control groups after the intervention, showed differences of statistical (p<.05), and practical significance (ES = 0.71, thus of a large effect and ES = 0.45, thus showing a medium effect, respectively) with the experimental group better than the control group after the intervention.

Table 5.6: Results of the ANCOVA, taking into account the pre-test scores

	M		MSE	P	ES
	E	C			
One leg balance L	9.17	9.16	3.34	0.999	0.00
One leg balance R	9.23	9.24	2.82	0.978	0.01
Balance walk forward	1.42	1.24	0.08	0.003*	0.71▫
Balance walk backward	1.33	1.20	0.43	0.058*	0.45∞
Hopping L	9.47	9.60	1.25	0.967	0.01
Hopping R	9.48	9.76	1.06	0.664	0.10
Skipping	2.44	2.52	2.30	0.769	0.07
Catching	4.17	4.48	0.79	0.272	0.26
Ball-kicking	2.09	1.84	0.99	0.386	0.20
Finger-to-nose	2.11	2.04	1.09	0.874i	0.04

*Note: M = mean, MSE= mean standard error; * = statistically significant where p ≤ 0.05; ES = Effect size, where ∞ indicates a medium effect (close to 0.5), and ▫ indicates a large effect (close to 0.8).*

5.3 Discussion of results

The results will be discussed in light of the primary and secondary aims of the study, starting with the secondary aim, which pertained to the levels of perceptual-motor skills of the Grade 1learners before the onset of the PE programme.

5.3.1 The perceptual-motor skill levels of the participants before the onset of the PE programme

In summary, the results show that several perceptual-motor skills of the Grade 1's in this study, specifically the balance walk forward, the balance walk backward, skipping, ball catching, ball kicking and the finger-to-nose skills, were below average for their age before the onset of the PE programme. The latter incorporates perceptual-motor skills within dynamic balance, total body coordination, hand-eye coordination, foot-eye coordination and body and spatial awareness (Donnelly *et al*., 2017:34).

The results showing below-average levels of perceptual-motor skills in the current study, are similar to those of several studies (Coetzee, 2016:19; Hardy *et al.*, 2013:1967; Pienaar & Kemp, 2014:172) that show that children's gross and perceptual-motor competencies, were low when compared to those of their corresponding age-norms. In South Africa, Pienaar and Kemp (2014:172) studied the motor proficiency levels of 816 Grade 1 learners in the North-West Province, and found that the motor proficiency levels of 49.63% of the group were below average, while those of 48.16% were average. In the same research population, Coetzee (2016:19) found that 34.88% of the nine- to 10-year-old children had below average balance skills.

Hardy *et al*. (2013:1967) studied the trends of fundamental movement skills in more than 13 000 nine- to 15-year-old Australian children over a time period of 13 years, and found that, although there had been improvements, the children's levels of fundamental movement skills were still below average especially with regard to total body coordination skills. Chen *et al*. (2017:222) tested more than 1200 learners in kindergarten and Grade 1 in the USA and found that only between 65% and 78% of the learners showed competent levels of foot-eye, hand-eye and total body coordination skills.

As discussed in Chapter 2, age-appropriate levels of perceptual-motor skills play an important role in the optimal development of physical, social, emotional, cognitive and sport skills in the childhood years and beyond. Therefore, the below-average levels of perceptual-motor skills of the participants in the current study, are worrying. In the current study, participants struggled to master basic motor skills, which they should have mastered already by the age of six to seven years (Donnelly *et al*., 2017:23).

According to literature (Donnelly, 2017:34) this can result in further delays in motor skill proficiency and decreased participation in physical activities.

A lack of facilities and equipment may have contributed to the current study's results before the onset of the PE programme. It has been shown in previous research that shortages of facilities played a part in learners' low participation rates in sports (Mchunu & Le Roux, 2010:85). McLennan and Thompson (2015:88) state that, in order to acquire the best results and develop fundamental movement skills, and coordination skills in particular, children need equipment, available space and practice opportunities with their peers. Korkmaz and Kuter (2002:8) agree that the learning environment is fundamental to quality PE, and a trained PE teacher can contribute to improving the learning environment even in lower socio-economic circumstances. Experienced and trained PE teachers are always in need to present a physical movement programme, since this factor contributes to the success of the PE programme (Korkmaz & Kutor, 2002:8). In this regard, Bardid (2016:3), in a study done in Belgium, provided evidence that a fundamental movement skill programme is more effective when presented by trained PE teachers and motor development experts.

5.3.2 The effects of the PE programme on the perceptual motor skills of the Participants

The results show that after completion of the PE programme, the experimental group showed statistically and practically significant improvements in specific perceptual-motor skills, indicating improvement in dynamic balance and coordination.

According to the results of the paired t-tests, the experimental group showed statistically and practically significant improvement after the programme, whereas the control group showed none. The paired t-tests specifically revealed remarkable improvement for the experimental group, in the balance-walk forward and backwards - skills that represent the ability of dynamic balance, and ball-catching representing hand-eye coordination, ball-kicking representing foot-eye coordination and hopping, which represents total body coordination and dynamic balance. The ANCOVA confirmed that there was an improvement in only the experimental group's balance walk forward and backwards, but no improvement for the control group.

The improvement in balance and coordination skills of participants in this study is both similar and dissimilar to results found in the study of Africa and Van Deventer (2015:6) regarding the fundamental movement skills of nine- to 12-year old children in a previously disadvantaged school in Stellenbosch after the completion of a 12-week-long fundamental movement skill development programme. In contrast to the findings of the current study, no significant improvements in balance skills were found (Africa & Van Deventer, 2015:6). However, in support of the findings of the current study, the bilateral coordination skills of the experimental group showed significant improvement after the intervention (Africa & Van Deventer, 2015:7).

Several other studies which investigated the effects of movement intervention programmes on motor skills, also found improvements in balance and coordination skills among children (Altinkök, 2016:1055, Gouws, 2015:1360; Van Niekerk *et al*., 2007:159) In the study of Altinkök (2016:1055), in which the researcher conducted a 12-week movement education programme among pre-school learners in Turkey (with the main focus of improving the participants' coordination skills), it was concluded that the experimental group's hand-eye coordination, total body coordination, agility and static balance skills had improved significantly. In the study of Gouws (2015:1360) among six- to eight-year old learners in the northern Zululand area of KwaZulu-Natal that investigated the influence of an eight-week kinder kinetics intervention programme on the scholastic and motor performance of the participants, it was found that the experimental group's static and dynamic balance, and their bilateral coordination had improved significantly. Van Niekerk *et al*. (2007:159) found significant improvement in the balance and bilateral coordination skills, among other motor skills, in seven- to 14-year old street children after a 10-week intervention programme in Potchefstroom, South Africa. A study done by Ericsson (2008:21) confirmed improved balance and bilateral coordination skills amongst Swedish children after participating in a physical activity and motor training programme. The Sports, Play and Active Recreation for Kids (SPARK) programme, a long-term school intervention programme in the USA entailed a PE curriculum designed to provide sufficient amounts of physical activity in the PE class, the promotion of physical activity outside school, and extensive teacher training and support. The results of motor tests in this programme showed significant improvement in motor skills among the elementary school learners, specifically in

coordination and balance skills during the course of the programme (Bahrami *et al*., 2016:978).

Learners' motor skills also improved in the study of Tester *et al*. (2014:127) among six- to twelve-year old learners from Australia, when results were collected over a period of 30 years and including 27 000 learners. The researchers pointed out that the disadvantaged social background of the participants in the study had contributed to the results, as the children had not been exposed to any motor development before the study. Dollman *et al*. (2005:892) also found that participants' motor skills in their study had improved after an intervention programme in a low socio-economic environment, and Erasmus *et al*. (2016) concluded in their research that learners (five to six years old) from a deprived environment had benefited from a perceptual-motor skill intervention programme.

Some of the factors associated with schools in lower socio-economic circumstances, as mentioned in the studies above, could also have made a contribution to the findings in the current study. As the Grade 1's in the study had not been exposed to a structured perceptual-motor skill programme before, this could have contributed to the improvements in their perceptual-motor skills. The fact that a trained PE teacher presented developmentally-appropriate PE lessons aimed at motivating learners to be physically active after school hours could have contributed to the results of the current study.

The improvements in balance and coordination skills in this study are significant, as these skills can indirectly contribute to the learners' academic achievement (Medina, 2014:35). Balance is often considered to be closely related to auditory-perceptual skills and can indirectly affect academic performance (Gouws, 2015:1360). Coordination, especially bilateral coordination which entails the ability to use both arms and/or legs together in a coordinated way, provides the foundation for the establishment of hand dominance and is used in various school tasks (Africa & Van Deventer, 2015:2).

5.4 Summary

The results showed that the perceptual-motor skills of the participants were generally below average compared to age norms before the intervention, which could be

attributed to factors related to schools in lower socio-economic circumstances, such as a lack of facilities and equipment, and untrained PE teachers.

The findings further show that the 10-week perceptual-motor skill programme significantly improved learners' dynamic balance and coordination skills, with regard to which the trained teacher, improvising on equipment and presenting quality PE lessons, could undoubtedly have contributed.

In light of these results, the recommendations, limitations and the conclusions of the study will be discussed in the following chapter.

CHAPTER 6:
Summary, conclusions and recommendations

6.1. Introduction

The aim of this study was to determine the effect of a Physical Education (PE) programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa. This chapter contains a summary of the different chapters of the study, followed by conclusions and recommendations based on the findings.

6.2. Summary

The problem statement, research design and aims are enunciated in Chapter 1. The problem statement focuses on literature related to the value of perceptual-motor skills, challenges for learners in rural schools in South Africa, and the effects of motor intervention programmes in other countries and in South Africa. The research questions, aims and methodology, including the research design, theoretical grounding, study population, collection of data and ethical considerations, and the structure of the thesis, are explained afterwards. The research design entails quantitative research, where numerical data is collected by pre- and post-tests, before and after the implementation of the PE programme.

The importance of perceptual-motor development in the Foundation Phase is highlighted by literature in Chapter 2. Mastering fundamental perceptual-motor skills establishes a foundation for a child's development and facilitates processes for children to learn more and develop motor skills, which increases their lifelong participation in physical activity. Furthermore, perceptual-motor development is important for the optimal development of physical, cognitive, emotional, social and sport skills. Well-developed perceptual-motor skills add to learners' ability to perform more advanced forms of movement and to apply them in more sport-specific skills. Improved motor competency also leads to increased physical activity levels, which promotes a positive lifestyle and contributes to long-term health outcomes (Cattuzzo *et al*., 2016:123). According to the literature (Vecameghi *et al*., 2013:586), learners who had previously received no perceptual-motor stimulation during their childhood years, would be prone to underdeveloped motor skills, a less active lifestyle and the

inability to master more complicated movement skills. The optimal development of perceptual-motor skills further improves cognitive development and academic achievement, since movement skills facilitate enhanced brain function through sensory integration and the development of perceptual abilities such as spatial awareness and coordination (Voelcker-Rehage *et al*., 2010:167). Positive relationships have been found between perceptual-motor skills and academic performance, which confirm the importance of including a perceptual-motor skill programme at a young age. Optimal perceptual-motor development also leads to improved social skills and emotional well-being; these enhance learners' self-esteem, self-worth and self-image, which then allows them to have confidence to participate in sports as well.

The review of literature in Chapter 3 includes the nature and effects of PE programmes in the Foundation Phase. The chapter compares the effects, characteristics and challenges of PE programmes, implemented in other countries, with those in South Africa. PE programmes are implemented from an early stage of learners' development in most countries like Australia, New Zealand, China, USA and Japan. In all the reviewed curricula, the focus for Foundation Phase learners is on building a foundation of basic fundamental movement skills within a safe environment, while some programmes focus on other skills such as decision-making, a positive attitude, the enhancement of social relationships, sportsmanship and emotional intelligence. Other positive characteristics that are associated with quality PE programmes in the Foundation Phase, are fixed time-allocations, qualified PE teachers, access to teaching resources, safe environments and a national assessment plan. The South African prescribed PE curriculum is similar to programmes in other countries, but literature shows that the curriculum is not always implemented according to the policy prescriptions because of several challenges, amongst which a lack of qualified PE teachers. Rural areas struggle mostly with unqualified teachers, and also with unsafe environments, a lack of resources, and the absence of support and motivation. This background highlights the need for setting and achieving the aims of this study.

Chapter 4 discusses the methodology of the study. The study entails quantitative research, incorporating the collection of data before and after the PE programme, by using a pre-and post-test design. A positivistic approach is followed in the study and the convenience sample from a school in a low socio-economic area, entailed a group

of 103 Grade 1's, of which the experimental group totalled 78 and the control group 25 participants. The perceptual-motor skills of all the participants were tested using a collection of perceptual-motor skill tests from standardised motor skill and motor proficiency test batteries, before and after the 10-week long weekly programme. The data analysis, using the IBM SPSS (SPSS, 2018) computer programme, included descriptive statistics and inferential statistics including t-tests and ANCOVA. In the study all possible ethical aspects were addressed and the correct procedures as prescribed for ethical approval from the Education, Management, and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (NWU-EMELTEN-REC) of the North-West University, were followed. The PE programme was also presented to the control group after the completion of the study.

The results are presented and discussed in Chapter 5. In this study it was found that the perceptual-motor skills, especially the balance walk forward, the balance walk backward, skipping, ball catching, ball kicking and the finger-to-nose skills of both the experimental and control groups were below average compared to age norms before the PE programme. After the 10-week PE-programme, the experimental group's balance walk forward and backwards, ball catching, ball kicking and hopping skills showed improvement of statistical and practical significance according to the dependent and independent t-tests. The ANCOVA confirmed that there was an indication of improvement only in the experimental group in the balance walk forward and the balance walk backwards skills, but no improvement for the control group. The results of this study therefore show that the PE programme had an effect on the perceptual-motor skills of balance and coordination. Various research studies show a similar improvement in balance and coordination skills after the participation of young learners in movement intervention programmes (Altinkök, 2016:1050; Gouws, 2015:1360; Van Deventer, 2015:13).

6.3. Conclusions

Regarding the aims of this study, the following conclusions can be made.

6.3.1 The primary aim of the study

The primary aim of the study was to determine the effect of a PE programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa.

The results show that balance walk forward and backwards, ball catching, ball kicking and skipping improved significantly after the PE programme. The hypothesis that the PE programme will have a positive effect on and improve the perceptual motor skills of Grade 1-learners in a primary school in South Africa, can therefore be partially accepted since several skills, though not all, showed improvement.

6.3.2 The secondary aim of the study

The secondary aim of this study was to determine the levels of perceptual-motor skills of Grade 1learners in a primary school in South Africa in comparison with age norms, before the commencement of the PE programme. Since the results show that the learners' perceptual-motor skills (especially balance walk forward and backward, skipping, ball catching, ball kicking and the finger-to-nose skills of both the experimental and control groups), were below average in relation to those of their age norms before the PE programme, the following may be declared: that the set hypothesis can be accepted, viz. that the levels of perceptual-motor skills of Grade 1-learners in a primary school in South Africa, would be below average in comparison with their age norms.

6.4 Recommendations

Based on the findings of this study, several recommendations can be made, firstly, regarding the presentation of PE programmes in schools, and secondly in light of some limitations, regarding future research. The following recommendations can be made regarding the presentation of PE programmes in primary schools:

6.4.1 The below-average scores achieved during the perceptual-motor skills tests of the Grade 1-learners in this primary school in a low socio-economic area, could possibly be attributed to a lack of structured PE and perceptual motor skill stimulation due to their deprived environment and resources. Therefore, the recommendation can be made that scientifically-structured, developmentally-appropriate PE intervention programmes should be implemented in primary

schools, especially in low socio-economic areas, to improve the levels of motor skills of their learners. It is important for a school to strive towards increasing physical activity amongst children, and therefore it is suggested that PE intervention programmes from as early as Grade R should be implemented to enhance children's motor skills.

6.4.2 Based on the findings of this study it is also recommended that special attention should be given to learners' coordination and balance skills in PE programmes in the Foundation Phase, as these skills are closely related to other aspects of learner development and can indirectly play a role in their academic achievement.

6.4.3 It is recommended that teachers should receive more extensive training in the presentation of PE, especially in the Foundation Phase, to be able to design and implement perceptual-motor skill programmes so that they have knowledge and understanding of the importance of movement.

6.4.4 Another recommendation would include a broader, more in-depth and user-friendly guide for teachers to use in the Foundation Phase, in addition to the existing guidelines of the CAPS. This may include more explanatory lesson plans and a wider variation of activities that can be implemented during a PE lesson.

6.4.5 It is suggested that governmental bodies enhance their support by means of the provision and upgrading of facilities and resources for PE in schools, so that safe and suitable physical activities that stimulate the development of perceptual-motor skills, can occur.

6.4.6 In schools that have a shortage of facilities and equipment, apparatus and equipment can be self-made with recyclable and recycled materials to help with the expenses and to contribute towards the conservation of the environment. The making and improvisation of equipment can also be integrated with other subject areas like Creative Arts, with learners making their own equipment.

6.5. Limitations and recommendations for future research

The results of this study should be considered in the light of certain limitations, which could also lead to recommendations for further research. The Grade 1's of only one school in one area of South Africa were used as test-subjects in this study. For future research, it is recommended that more schools, in various areas of the country, should be involved. Also, the relatively small sample size of this study, namely one experimental and one control group with a total of 103 learners, warrants the need to conduct further research involving larger samples in order to substantiate the present findings.

Another limitation, namely the short duration of the intervention PE programme in comparison to some other intervention studies, can be addressed in future studies by extending the duration by some weeks.

Despite the limitations of this study, it can be suggested that future research can also focus on other aspects that can be affected by a well-structured PE programme, like academic achievement and learner discipline.

6.6 Conclusion

In conclusion, a scientific, developmentally- appropriate PE programme presented by a trained PE teacher can improve the perceptual-motor skills of young learners in lower socio-economic areas. These findings are important because, although movement and play might be seen as basic or ordinary activities to some, perceptual-motor movements, such as those in an effective PE programme, play a key-role in a child's holistic development.

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Addenda

Addendum A: Parental permssion for particpants (experimental group)

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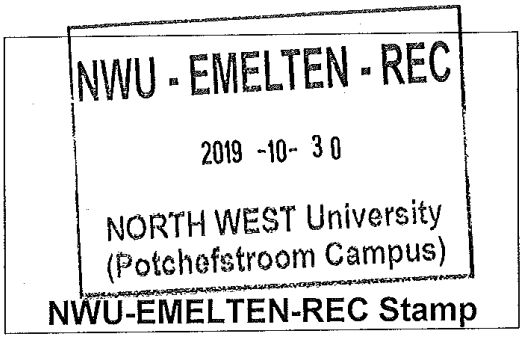
The Faculty of Health Sciences Ethics Office of the North-West University is acknowledged for the use of their document with minor adjustments made by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (NWU-EMELTEN-REC).



NWU-EMELTEN-REC Stamp

Informed consent documentation for parents of Grade1 learners involved in a Physical Education programme

TITLE OF THE RESEARCH STUDY: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. D. du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet
Panorama
Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Dear parent,

Your child is being invited to take part in a **research study** that forms part of a Masters study in Education. Please take some time to read the information presented here, which will explain the details of this study. Please ask the researcher or person explaining the research to you any questions about any part of this study that you do not fully

understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how your child might be involved. Also, your child's participation is **entirely voluntary** and you are free to say no for him or her to participate. If you say no, this will not affect your child negatively in any way whatsoever. Your child is also free to withdraw from the study at any point, even if you do agree for him or her to take part now.

This study has been approved by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU.....) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

- We plan to determine the influence of a Physical Education (PE) programme on the perceptual-motor (movement) skills of Grade 1 learners in your child's primary school in QwaQwa. The PE programme, which will include exercises such as throwing and catching a ball, running, jumping and balancing, will be presented once a week for 4 months, in school time, and your child will do simple PE tests (like standing on one leg, jumping and catching a ball) before and after the programme.
- This study will be conducted in your child's primary school in QwaQwa and will be done by an experienced researcher and teacher in the school, trained in PE, and 90-100 participants will be included in this study.

Why has your child been invited to participate?

- Your child has been invited to be part of this research because he / she is a Grade 1 learner in the school.

What will be expected of your child?

- Your child will be expected to participate in the programme once a week for an hour (in the normal school PE time) for four months. The learner will be expected to participate in several activities that focus on developing perceptual-motor (movement) skills, according to the PE curriculum in the school curriculum (CAPS). Each lesson will be compiled according to the guidelines of the CAPS for PE, and will consist of a warm-up, which will include locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a close-by colour, shape or pattern. The main part of the lesson will consist of activities presented at stations, with each station consisting of a different fundamental movement skill from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). Each lesson will finish off with an appropriate cooling-down activity, for example stretching activities. The programme will also include certain elements like rhythm and target games.

- Your child will be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the programme.

Will your child gain anything from taking part in this research?

The gains for your child if he or she takes part in this study could be:

- improving his/her motor skills, social skills and overall participation in physical activities. Research shows that the improvement of motor skills can also impact positively on academic achievement and health.
- improving and preparing your child for sport-specific skills.

Are there risks involved in your child taking part in this research and what will be done to prevent them?

The risks for your child in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests and activities, but the teacher will allow sufficient rest between tests and activities, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests and activities because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested or who are doing activities, will not be singled out or put on the spot before other learners.
- The unlikely risk of physical injury always exists in PE lessons, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for your child in joining this study than there are risks.

How will your child benefit from taking part in this research?

- The direct benefit for your child as a participant, and for you as parent, is that you will receive prompt feedback on his/her own levels of motor-skills, and that you will be able to see whether his/her levels of motor-skills have improved after the four months.
- The indirect benefits are that the motor-skill results will contribute to improving the effectiveness of the Physical Education programme, and also to enhance the physical well-being of learners.

How will we protect your child's confidentiality and who will see our findings?

- Anonymity of your child's findings will be protected by the University. Your child's privacy will be respected by keeping his / her name anonymous in reporting the results in the research study. His/her results will be kept confidential by storing it

on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the study leader's office and for electronic data it will be password protected. Data will be stored for five

hat will happen with the findings or samples?

- The findings of this study will not be used in future for related studies and topics.

How will you know about the results of this research?

- You will receive a confidential report of your child's motor skill test results from the researcher.
- A general feedback meeting for parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.

Will you be paid for your child to take part in this study and are there any costs for you?

You will not be paid for your child to participate in this study as this study is not funded and there will be no travel expenses for you, as your child will be participating in the PE programme during normal school hours at the school. There will thus be no extra costs involved for you, if your child takes part in this study. Your child will, however, receive a certificate for participating in the PE programme, in a school assembly or at the school prize giving function.

Is there anything else that you should know or do?

- You can contact the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and permission form for your own purposes.

Declaration by participant's parent

By signing below, I ..... agree to let my child, ...take part in the research study: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the permission from me, as well as the researcher and all my questions have been answered.
- I understand that taking part in this study is **voluntary** and my child has not been pressurised to take part.
- My child may choose to leave the study at any time and will not be handled in a negative way if he/she does so.
- My child may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if he/she does not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) ..... 20....

....

Signature of participant's parent Signature of witness

Declaration by person obtaining permission

I *(name)* ..... declare that:

- I clearly and in detail explained the information in this document to

  .....

- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of person obtaining permission

Declaration by researcher

I *(name)* .....Simone van Zyl..... declare that:

- I explained the information in this document to .....
- I did not use an interpreter
- I encouraged him/her to ask questions and took adequate time to answer them
- The parental permission was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of researcher

Addendum B: Parental permission for control group

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NWU - EMELTEN - REC
2019 -10- 30
NORTH WEST University
(Potchefstroom Campus)

NWU-EMELTEN-REC Stamp

Informed consent documentation for parents of Grade1 learners

TITLE OF THE RESEARCH STUDY: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. D. du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet
Panorama
Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Dear parent,

Your child is being invited to take part in a **research study** that forms part of a Masters study in Education. Please take some time to read the information presented here, which will explain the details of this study. Please ask the researcher or person explaining the research to you any questions about any part of this study that you do not fully

understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how your child might be involved. Also, your child's participation is **entirely voluntary** and you are free to say no for him or her to participate. If you say no, this will not affect your child negatively in any way whatsoever. Your child is also free to withdraw from the study at any point, even if you do agree for him or her to take part now.

This study has been approved by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU.....) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

We plan to determine the influence of a Physical Education (PE) programme, presented by a specialist PE teacher, on the perceptual-motor (movement) skills of Grade 1 learners in another school in your area in QwaQwa. To be able to say that this PE programme was the reason for any significant effects, we have to use a control group (a group of Grade 1's who did not receive PE from this specific teacher). The control group will undergo the same perceptual-motor (movement) skills tests as the experimental group (the group who will receive the PE classes from the specific teacher), at the beginning and the end of four months. These PE tests are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, and will be done in school time by the specialist teacher during the normal PE time, and will entail simple motor tests (like standing on one leg, jumping, and catching a ball).

Why has your child been invited to participate?

Your child has been invited to participate because 1) your child is in the same Grade (Grade 1) as the learners in the experimental group, 2) your child's school is located in the same area as the experimental school, and 3) your child will not receive PE classes from the specific specialist PE teacher in the next four months.

What will be expected of your child?

If you agree that your child can participate in the research your child will be expected to

- Your child will be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the four months programme.

Will your child gain anything from taking part in this research?

The direct benefit for your child as a participant, and for you as parent, is that you will receive prompt feedback on his/her perceptual-motor (movement) skills, compared to norms for his/her age.

The indirect benefits are firstly, that the specialist PE teacher involved in the study will offer free training to your child's PE teacher in presenting the PE programme (that the experimental group will receive), after the study. Secondly, the results of this study will contribute to improving the effectiveness of the PE programme with the aim of training future quality PE teachers.

Are there risks involved in your child taking part in this research and what will be done to prevent them?

The risks for your child in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests, but the teacher will allow sufficient rest between tests, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested, will not be singled out or put on the spot before other learners.
- The unlikely risk of physical injury always exists in PE tests, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for your child in joining this study than there are risks.

How will we protect your child's confidentiality and who will see our findings?

- Anonymity of your child's findings will be protected by the University. Your child's privacy will be respected by keeping his / her name anonymous in reporting the results in the research study. His/her results will be kept confidential by storing it on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. Data will be stored for 5 years.

What will happen with the findings or samples?

- The findings of this study will not be used in future for related PhD studies and topics.

How will you know about the results of this research?

- You will receive a confidential report of your child's motor skill test results from the researcher.
- A general feedback meeting for parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.

Will you be paid for your child to take part in this study and are there any costs for you?

You will not be paid for your child to participate in this study as this study is not funded and there will be no travel expenses for you, as your child will be doing the motor tests in PE during normal school hours at the school. There will thus be no extra costs involved for you, if your child takes part in this study.

Is there anything else that you should know or do?

- You can contact the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and permission form for your own purposes.

Declaration by participant's parent

By signing below, I ..... agree to let my child, ...take part in the research study: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the permission from me, as well as the researcher and all my questions have been answered.
- I understand that taking part in this study is **voluntary** and my child has not been pressurised to take part.
- My child may choose to leave the study at any time and will not be handled in a negative way if he/she does so.
- My child may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if he/she does not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) ..... 20....

....

Signature of participant's parent Signature of witness

Declaration by person obtaining permission

I *(name)* ..... declare that:

- I clearly and in detail explained the information in this document to

.....

- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of person obtaining permission

Declaration by researcher

I *(name)* .....Simone van Zyl..... declare that:

- I explained the information in this document to .....
- I did not use an interpreter
- I encouraged him/her to ask questions and took adequate time to answer them
- The parental permission was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of researcher

Addendum C: Permission form – principal of school of participants

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Private Bag X1290, Potchefstroom
South Africa 2520
Principal investigator:
Prof Dorita du Toit
Tel. 018 2991 1716
E-mail: dorita.dutoit@nwu.ac.za

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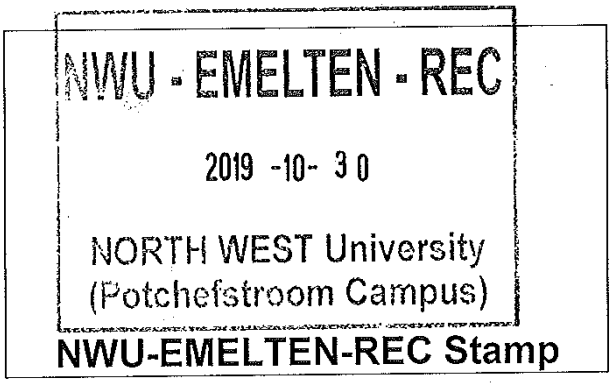

NWU-EMELTEN-REC Stamp

Principal
Ed-U-College
PO Box 1932
Bethlehem

Dear Sir/Madam

Re: Permission to conduct research at your school

I hereby cordially request your permission to conduct the following research study at Ed -U-College:

Title of the research study: *The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa*

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. Dorita du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet

Panorama
Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Your school is invited to take part in a **research study** that forms part of a Masters study in Education. Please take some time to read the information presented here, which will explain the details of this study. It is very important that you are fully satisfied that you clearly understand what this research is about and how your school might be involved. Also, your school's participation is **entirely voluntary** and you are free to say no for your school to participate. If you say no, this will not affect your school negatively in any way whatsoever. Your learners are also free to withdraw from the study at any point, even if you do agree for them to take part now.

This study has been approved by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU 00530-19-A2) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

- We plan to determine the influence of a Physical Education (PE) programme, presented by a specialist PE teacher, on the perceptual-motor (movement) skills of Grade 1 learners in your school in QwaQwa. The PE programme will be presented by a specialist PE teacher once a week for ten weeks, in school time, and your Grade 1's will do simple PE tests (like standing on one leg, jumping and catching a ball) before and after the programme.
- This study will be conducted in your school in QwaQwa and will be done by an experienced researcher and specialist PE teacher in the school, and the total group of Grade 1's will be included in this study.
- The total group of Grade 1's will be included in this study – the first three classes on your list of Grade 1 classes, will be included in the experimental group who will do the PE programme, while the fourth Grade 1 class will be included in the control group. The PE programme will be presented to the control group as well, after the completion of the after-tests, so that they will not be disadvantaged by being in the control group.

Why has your school been invited to participate?

- Your school has been invited to be part of this research because your school currently has a specialist PE teacher (who is not currently teaching in the Foundation Phase) who can present this PE programme to the Grade 1 learners in the school.

What will be expected of your learners?

- Your Grade 1 learners will be expected to participate in the programme once a week for an hour (in the normal school PE time) for four months. The learners will be expected to participate in several activities that focus on developing perceptual-motor skills, according to the PE curriculum in the school curriculum (CAPS). Each lesson will be compiled according to the guidelines of the CAPS for PE, and will consist of a warm-up, which will include locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a close-by colour, shape or pattern. The main part of the lesson will consist of activities presented at stations, with each station consisting of a different fundamental movement skill from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). Each lesson will finish off with an appropriate cooling-down activity, for example stretching activities. The programme will also include certain elements like rhythm and target games. During the presentation of the PE programme, the learners who will be in the control group, will continue with their normal school activities. After the second set of tests have been done, the control group will also receive the PE programme from the specialist teacher, so that they will not be disadvantaged by being in the control group.
- All the Grade 1's will also be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the programme.

Will your school gain anything from taking part in this research?

The gains for your school could be:

- Probable improvement of the motor skills, social skills and overall participation in physical activities of the Grade 1 learners. Research shows that the improvement of motor skills can also impact positively on academic achievement and health.
- Improving and preparing the learners for sport-specific skills.
- After the study, the PE programme will be provided to your school for future use, and training will be provided by the specialist PE teacher to your Grade 1 teachers to use the programme in future.

Are there risks involved in your learners taking part in this research and what will be done to prevent them?

The risks for your learners in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests and activities, but the teacher will allow sufficient rest between tests and activities, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests and activities because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested or who are doing activities, will not be singled out or put on the spot before other learners.
- The unlikely risk of physical injury always exists in PE lessons, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for your school in joining this study than there are risks.

How will we protect your learners' confidentiality and who will see our findings?

- Your learners' privacy will be respected by keeping their names anonymous in reporting the results in the research study. Their results will be kept confidential by storing it on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. Data will be stored for five years after which it will be destroyed.

What will happen with the findings or samples?

- The findings of this study will not be used in future PhD studies and topics.

How will you know about the results of this research?

- A general feedback meeting for teachers and parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.

Will your school be paid to take part in this study and are there any costs for your school?

Your school will not be paid to participate in this study because there will not be any costs involved if your school takes part in this study. Learners will, however, receive a certificate of participation after the programme, which can be presented to them during a school assembly or the prize-giving function of the school.

Is there anything else that you should know or do?

- You can contact me, the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.

Thank you very much for considering this request. I would appreciate it very much if you could communicate your decision in writing, to my above e-mail address.

Yours sincerely

Prof Dorita du Toit

Principal Investigator

Addendum E: Learners' assent witness declaration (experimental group)

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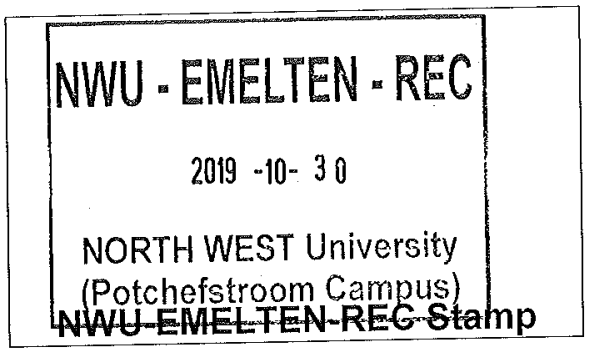

NWU-EMELTEN-REC Stamp

DECLARATION FORM FOR WITNESS, OF LEARNER ASSENT (EXPERIMENTAL GROUP)

TITLE OF THE RESEARCH STUDY: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. D. du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet
Panorama
Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Dear witness,

The Grade 1 learners of this school are being invited to take part in this research project conducted in two schools in the Free State province. The project is managed by Prof Dorita du Toit, an Associate Professor at the North-West University.

Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Please note that the learner participation should be entirely voluntary and that they are free to decline to participate. If the learner says no, this will not affect them negatively in any way whatsoever. They are also free to withdraw from the study at any point, even if they do agree to take part. Their involvement in the well-being initiative in the school will not be influenced by such a decision.

This study has been approved by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU-00530-19-S2) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

The objective of the study is to determine the effects of a Physical Education (PE) programme, presented by a specialist PE teacher, on the perceptual motor skills of Grade 1-learners in a primary school in South Africa.

In other words, whether a PE programme presented by a specialist PE teacher, can improve the perceptual motor skills of Grade 1-learners after four months of once-a-week PE lessons. To determine this, the following has to be done by each Grade 1 learner:

- Participation in a PE programme (as prescribed by the Curriculum and Assessment Policy Statement [CAPS]), 1-hour per class, once in a week.
- Undergoing an assessment his/her perceptual motor skills before the onset of the four months programme and after the programme, by doing nine motor skill tests as part of a collection of standardised test batteries (and according to the prescriptions of the CAPS). The specialist PE teacher will do the tests, which she has been trained for during the completion of her B.Ed. Honours degree.

Why has the learner been invited to participate?

- The learner has been invited to be part of this research because he / she is a Grade 1 learner in the school.

What will be expected of the learner?

- The learner will be expected to participate in the programme once a week for an hour (in the normal school PE time) for four months. The learner will be expected to participate in several activities that focus on developing perceptual-motor skills, according to the PE curriculum in the school curriculum (CAPS). Each lesson will be compiled according to the guidelines of the CAPS for PE, and will consist of a warm-up, which will include locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a close-by colour, shape or pattern. The main part of the lesson will consist of activities presented at stations, with each station consisting of a different fundamental movement skill from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). Each lesson will finish off with an appropriate cooling-down activity, for example stretching activities. The programme will also include certain elements like rhythm and target games.
- The learner will be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the programme.

Will the learner gain anything from taking part in this research?

The gains for the learner if he or she takes part in this study will be:

- improving his/her motor skills, social skills and overall participation in physical activities. Research shows that the improvement of motor skills can also impact positively on academic achievement and health.
- improving and preparing the learner for sport-specific skills.

Are there risks involved in the learner taking part in this research and what will be done to prevent them?

The risks for the learner in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests and activities, but the teacher will allow sufficient rest between tests and activities, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests and activities because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested or who are doing activities, will not be singled out or put on the spot before other learners.

- The unlikely risk of physical injury always exists in PE lessons, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for the child in joining this study than there are risks.

What will happen in the unlikely event of some form of discomfort occurring as a direct result of learners taking part in this research study?

Learners are free to withdraw from the research, as participation is voluntary without any consequences.

How will we protect the learner's confidentiality and who will see our findings?

- The learner's privacy will be respected by keeping his / her name anonymous in reporting the results in the research study. His/her results will be kept confidential by storing it on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. Data will be stored for five years.

What will happen with the findings or samples?

- The findings of this study will not be used in future for related studies and topics.

How will the learner know about the results of this research?

- The learner's parents will receive a confidential report about their child's motor skill test results from the researcher.
- A general feedback meeting for parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.

Will the learner or his/her parents be paid for taking part in this study and are there any costs for the learner or his/her parents?

The learner and his/her parents will not be paid to participate in this study as this study is not funded and there will be no travel expenses for them, as the learner will be participating in the PE programme during normal school hours at the school. There will thus be no extra costs involved for the learner or his/her parents, if he/she takes part in this study. The learner will, however, be awarded with a certificate at a school assembly or the school prize giving, if she or he completes the PE programme and fitness tests.

Is there anything else that the learner or you should know or do?

- You can contact the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and consent form for your own purposes.

Declaration by witness of learner's assent / dissent

I, ...declare that I have witnessed

(name of participant)..... Grade 1 .....,

giving assent to take part in a research study entitled: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa.

I declare that:

- I have read the information on the research project, and I have conveyed the information to the participant in a language with which he or she is fluent and comfortable.
- I have given the participant a chance to ask questions to both the person obtaining assent (myself), as well as the researcher and all the participant's questions have been adequately answered.
- I have witnessed the participant acknowledging that his or her taking part in this study is **voluntary** and that he or she has not been pressurised to take part.
- I have witnessed the participant acknowledging that he or she may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of witness

Addendum F: Learners' assent witness declaration (control group)

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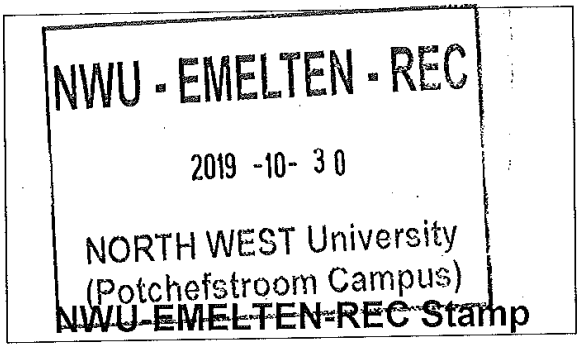

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DECLARATION FORM FOR WITNESS, OF LEARNER ASSENT (CONTROL GROUP)

TITLE OF THE RESEARCH STUDY: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. D. du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet
Panorama
Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Dear witness,

The Grade 1 learners of this school are being invited to take part in this research project conducted in two schools in the Free State province. The project is managed by Prof Dorita du Toit, a senior lecturer at the North-West University.

Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Please note that the learner participation should be entirely voluntary and that they are free to decline to participate. If the learner says no, this will not affect them negatively in any way whatsoever. They are also free to withdraw from the study at any point, even if they do agree to take part. Their involvement in the well-being initiative in the school will not be influenced by such a decision.

This study has been approved by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU-00530-19-S2) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

The objective of the study is to determine the effects of a Physical Education (PE) programme, presented by a specialist PE teacher, on the perceptual motor skills of Grade 1-learners in a primary school in South Africa.

In other words, whether a PE programme presented by a specialist PE teacher, can improve the perceptual motor skills of Grade 1-learners after 6-months of once-a-week PE lessons. To determine this, we have to use a control group (a group of learners who will not receive the PE programme presented by the specialist PE teacher). Therefore, the following has to be done by each Grade 1 learner:

- Undergoing an assessment his/her perceptual motor skills before the onset of the 6-month programme and after the programme, by doing nine motor skill tests as part of a collection of standardised test batteries (and according to the prescriptions of the CAPS). The specialist PE teacher will do the tests, which she has been trained for during the completion of her B.Ed. Honours degree.

Why has the learner been invited to participate?

- The learner has been invited to be part of this research because he / she is a Grade 1 learner in the school in the same area as the experimental school (the school where the Grade 1 learners will do the PE programme presented by the specialist PE teacher).

What will be expected of the learner?

- The learner will be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the programme.

Will the learner gain anything from taking part in this research?

The gains for the learner if he or she takes part in this study will be:

- Getting to know more about his or her movement skills, i.e. what the skills are called, how they are done and what they look like in comparison with age norms.

Are there risks involved in the learner taking part in this research and what will be done to prevent them?

The risks for the learner in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests and activities, but the teacher will allow sufficient rest between tests and activities, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests and activities because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested or who are doing activities, will not be singled out or put on the spot before other learners.
- The unlikely risk of physical injury always exists in PE tests, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for the learner in joining this study than there are risks.

What will happen in the unlikely event of some form of discomfort occurring as a direct result of learners taking part in this research study?

Learners are free to withdraw from the research, as participation is voluntary without any consequences.

How will we protect the learner's confidentiality and who will see our findings?

- Anonymity of the learner's findings will be protected by the University. The learner's privacy will be respected by keeping his / her name anonymous in reporting the results in the research study. His/her results will be kept confidential

by storing it on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. Data will be stored for five years.

What will happen with the findings or samples?

- The findings of this study will not be used in future for related PhD studies and topics.

How will the learner know about the results of this research?

- The learner's parents will receive a confidential report about their child's motor skill test results from the researcher.
- A general feedback meeting for parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.

Will the learner or his/her parents be paid for taking part in this study and are there any costs for the learner or his/her parents?

The learner and his/her parents will not be paid to participate in this study as this study is not funded and there will be no travel expenses for them, as the learner will be participating in the PE programme during normal school hours at the school. There will thus be no extra costs involved for the learner or his/her parents, if he/she takes part in this study.

Is there anything else that the learner or you should know or do?

- You can contact the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and consent form for your own purposes.

Declaration by witness of learner's assent / dissent

I, ...declare that I have witnessed

(name of participant)..... Grade 1 .....,

giving assent to take part in a research study entitled: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa.

I declare that:

- I have read the information on the research project, and I have conveyed the information to the participant in a language with which he or she is fluent and comfortable.
- I have given the participant a chance to ask questions to both the person obtaining assent (myself), as well as the researcher and all the participant's questions have been adequately answered.
- I have witnessed the participant acknowledging that his or her taking part in this study is **voluntary** and that he or she has not been pressurised to take part.
- I have witnessed the participant acknowledging that he or she may choose to leave the study at any time and will not be penalised or prejudiced in any way.

Signed at (*place*) ..... on (*date*) ..... 20....

.....

Signature of witness

Declaration by researcher

I *(name)* .....Simone van Zyl..... declare that:

- I explained the information in this document to

  .....(witness).
- I did not use an interpreter
- I encouraged him/her to ask questions and took adequate time to answer them
- The informed consent was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (*place*) ..... on (*date*) ..... 20....

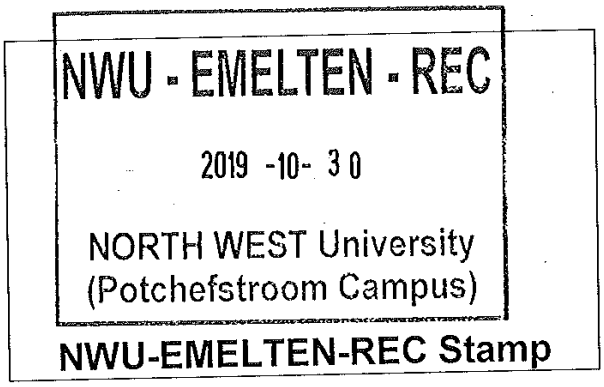
.....

Signature of researcher

Addendum G: Permission letter to the school's SGB

Private Bag X1290, Potchefstroom
South Africa 2520
Principal investigator:
Prof Dorita du Toit
Tel. 018 2991 1716
E-mail: dorita.dutoit@nwu.ac.za

The Faculty of Health Sciences Ethics Office of the North-West University is acknowledged for the use of their document with minor adjustments made by the North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (NWU-EMELTEN-REC).



NWU-EMELTEN-REC Stamp

Chair of the School Governing Body
Ed-U-College
PO Box 1932
Bethlehem

Dear Sir/Madam

Re: Permission to conduct research at your school

I hereby cordially request your permission to conduct the following research study at Ed -U-College:

Title of the research study: *The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa*

ETHICS REFERENCE NUMBER: NWU-00530-19-A2

PRINCIPAL INVESTIGATOR: Prof. Dorita du Toit

RESEARCHER / POST GRADUATE STUDENT: Simone van Zyl

ADDRESS: 6 Nonna Theronstreet
Panorama

Bethlehem 9701

CONTACT NUMBER: 072 400 7703

Your school is invited to take part in a **research study** that forms part of a Masters study in Education. Please take some time to read the information presented here, which will explain the details of this study. Please ask the researcher or person explaining the research to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how your school might be involved. Also, your school's participation is **entirely voluntary** and you are free to say no for your school to participate. If you say no, this will not affect your school negatively in any way whatsoever. Your learners are also free to withdraw from the study at any point, even if you do agree for them to take part now.

This study has been approved by the **North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Committee (EMELTEN-REC) (NWU-00530-19-S2)** and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

- We plan to determine the influence of a Physical Education (PE) programme, presented by a specialist PE teacher, on the perceptual-motor (movement) skills of Grade 1 learners in your school in QwaQwa. The PE programme will be presented by a specialist PE teacher once a week for ten weeks, in school time, and your Grade 1's will do simple PE tests (like standing on one leg, jumping and catching a ball) before and after the programme.
- This study will be conducted in your school in QwaQwa and will be done by an experienced health researcher and specialist PE teacher in the school.
- The total group of Grade 1's will be included in this study – the first three classes on your list of Grade 1 classes, will be included in the experimental group who will do the PE programme, while the fourth Grade 1 class will be included in the control group. The PE programme will be presented to the control group as well, after the completion of the after-tests, so that they will not be disadvantaged by being in the control group.

Why has your school been invited to participate?

- Your school has been invited to be part of this research because your school currently has a specialist PE teacher (who is not currently teaching in the

Foundation Phase) who can present this PE programme to the Grade 1 learners in the school.

What will be expected of your learners?

- Your Grade 1 learners will be expected to participate in the programme once a week for an hour (in the normal school PE time) for four months. The learners will be expected to participate in several activities that focus on developing perceptual-motor skills, according to the PE curriculum in the school curriculum (CAPS). Each lesson will be compiled according to the guidelines of the CAPS for PE, and will consist of a warm-up, which will include locomotor activities such as running, hopping, skipping, and body awareness activities, for example using different body parts to touch a close-by colour, shape or pattern. The main part of the lesson will consist of activities presented at stations, with each station consisting of a different fundamental movement skill from the categories of hand-eye-coordination (for example, bouncing and catching a ball), balance (for example, walking on a rope), foot-eye-coordination (for example, kicking a ball through a hoop) and spatial awareness (for example, climbing over a hurdle). Each lesson will finish off with an appropriate cooling-down activity, for example stretching activities. The programme will also include certain elements like rhythm and target games. During the presentation of the PE programme, the learners who will be in the control group, will continue with their normal school activities. After the second set of tests have been done, the control group will also receive the PE programme from the specialist teacher, so that they will not be disadvantaged by being in the control group.
- All the Grade 1's will also be expected to undergo simple motor tests (like standing on one leg, jumping, and catching a ball), which are anyway part of the prescribed PE assessment for Grade 1's as stipulated by the CAPS, before and after the programme.

Will your school gain anything from taking part in this research?

The gains for your school will be:

- Knowing what the Grade 1 learners' movement skills look like in comparison with age norms.
- Probable improvement of the motor skills, social skills and overall participation in physical activities of the Grade 1 learners. Research shows that the improvement of motor skills can also impact positively on academic achievement and health.
- Improving and preparing the learners for sport-specific skills.
- After the study, the PE programme will be given to your school for future use, and training will be provided by the specialist PE teacher to your Grade 1 teachers to use the programme in future.

Are there risks involved in your learners taking part in this research and what will be done to prevent them?

The risks for your learners in this study are minimal but will be limited with caution. The possible risks are part of normal PE classes, as prescribed by the CAPS curriculum, and will be managed according to normal PE teaching guidelines. These possible risks, and how the researcher/teacher will limit them, are:

- Learners may experience slight physical discomfort (tiredness) when doing the motor tests and activities, but the teacher will allow sufficient rest between tests and activities, and will communicate continuously with learners about how they are feeling and whether they want to rest or stop.
- Learners may experience slight discomfort when doing the motor tests and activities because other learners may be watching, but the teacher will limit this by providing safe activities for all other learners to do at the same time, so that learners who are being tested or who are doing activities, will not be singled out or put on the spot before other learners.
- The unlikely risk of physical injury always exists in PE lessons, but the teacher is well-trained to apply all pre-cautionary safety measures in the PE class to minimise possible injuries, and she is trained in First Aid in case an injury should occur.
- There are more gains for your school in joining this study than there are risks.

How will we protect your learners' confidentiality and who will see our findings?

- Anonymity of your learners' findings will be protected by the University. Your learners' privacy will be respected by keeping their names anonymous in reporting the results in the research study. Their results will be kept confidential by storing it on the study leader's computer, protected by a password. Hard copy findings will be kept safe by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected. Data will be stored for five years.

What will happen with the findings or samples?

- The findings of this study will not be used in future for related PhD studies and topics.

How will you know about the results of this research?

- A general feedback meeting for teachers and parents of the learners will be arranged to take place at the school and further suggestions will be given to parents about enhancing their children's motor-skills.
- Individual reports on the test results of each learner will also be given in writing to the parents of that learner at the meeting.

Will you be paid for your school to take part in this study and are there any costs for you?

You will not be paid for your school to participate in this study as this study is not funded and there will be no travel expenses for you, as your learners will be participating in the PE programme during normal school hours at the school. There will thus be no extra costs involved for you, if your school takes part in this study. Learners will, however, receive a certificate of participation after the programme, which can be presented to them during a school assembly or the prize-giving function of the school.

Is there anything else that you should know or do?

- You can contact the principal investigator, Prof Dorita du Toit, at 0824548437, or the researcher, Simone van Zyl, at 072 400 7703 if you have any further questions or have any problems.
- You can also contact the North-West University EMELTEN-REC Research Ethics Committee via Mrs Marlize Bisschoff at 018 299 4707 or marlize.bisschoff@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.

Thank you very much for considering this request. I would appreciate it very much if you could communicate your decision in writing, to my above e-mail address.

Yours sincerely

Prof Dorita du Toit

Principal Investigator

Addendum J: Pictorial document which will be used by independent person obtaining assent from learners

Will you take part in these exercises, once a week at school, where you will do exercises like

running

jumping,

playing ball,

hoola hoop,

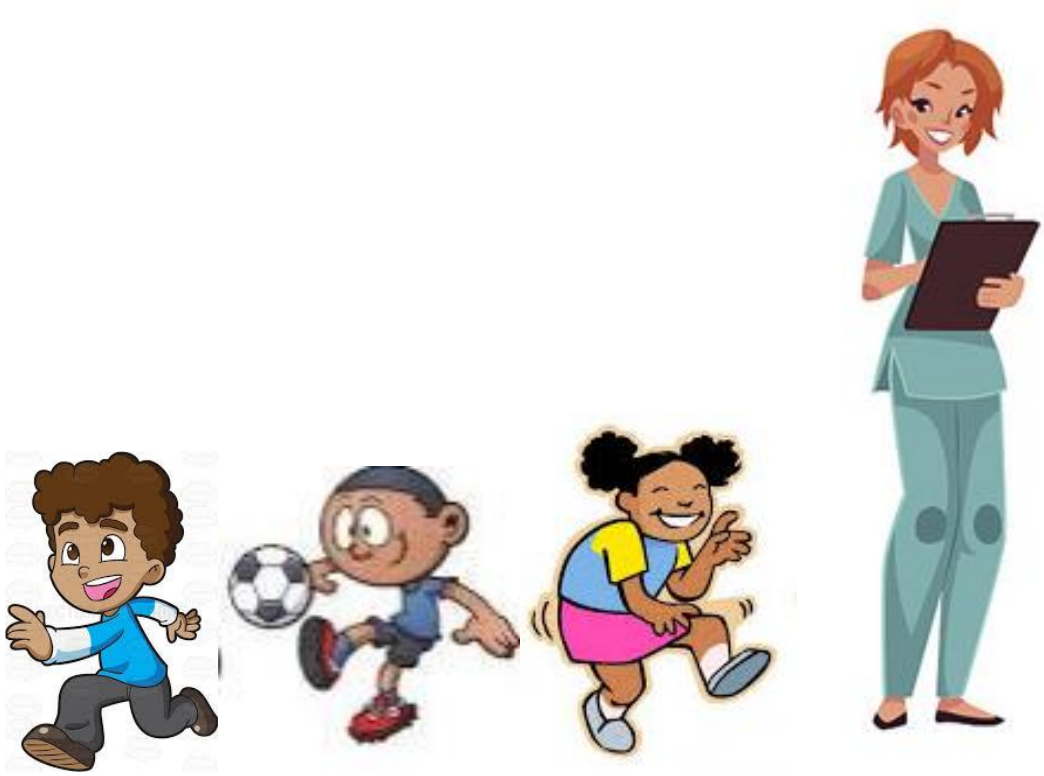
and balancing?

Before the exercises start, the teacher will write down how you run, jump, throw and catch a ball, and balance.

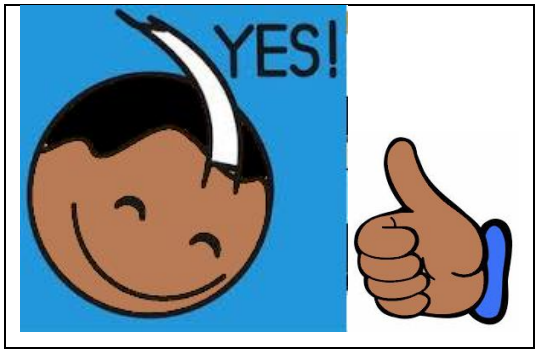
During the exercises, if you get tired or feel that something hurts

you can tell the teacher and she will let you rest, or you can stop at any time.

After four months of the exercises, at the end of the year, the teacher will again write down how you run, jump, throw and catch the ball, and balance.



You can say yes or no of you want. Will you take part in these exercises and can the teacher write down how you do them?



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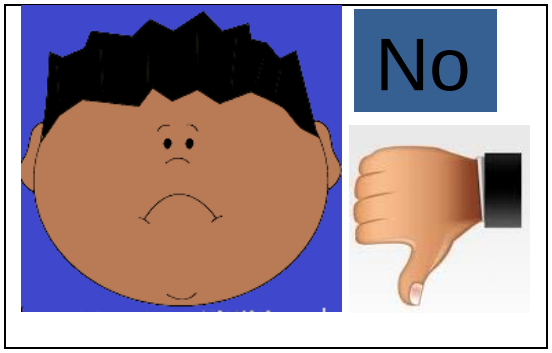
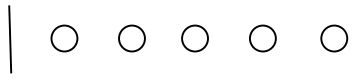


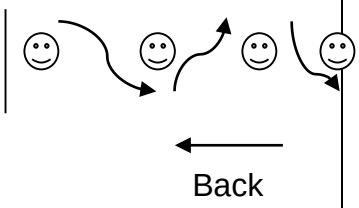
Addendum K: Certificate for reimbursement of learners

Addendum L: Physical Education programme

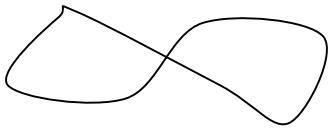
Lesson 1			Aim of lesson: Different ways to move
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Body awareness Locomotor skills	Teacher gives instructions to learners (learners act out different movements given): See if you can.... Run as soft as a mouse, Loud as an elephant, on tippy toes, See if you can walk as tall a giraffe and as small as a rabbit, See if you can hop as a kangaroo and move as slow as a tortoise See if you can fly as high as a bird. Learners stretch downwards.	Learners stand in own space (arms spread out) in line format. Teacher in front. Or Learners stand in circle format and teacher in the middle
Lesson body:			
5min	Static balance	Stand on one leg, with hoop around waist (should not touch). Open and closed eyes.	Hoops Learners stand side by side.
5min	Dynamic balance	Learners walk on the rope, rope can be shaped in different forms.	Rope Learners take turns, one at a time.
5min	Hand-eye-coordination	Learners stand still inside a hoop and hop a ball.	Hoops and balls. Each learner in their own hoop.

5min	Dynamic balance? Hand-eye coordination	Learner walks in between cones, while hopping and catching a ball.	Cones and balls Learners takes turns one at a time.
5min	Spatial awareness	Learners skip between cones	Cones 
Conclusion/warm-down:			
5min	Tense and relax body	Learners lay on their backs, with arms and legs spread out. Learners listen to what they must do, Learners tense their whole body from top to bottom first and then relax from bottom to top so that whole body relaxes.	Each learner in own space in circle format.
Comments:			

Lesson 2			Aim of lesson: Focus on coordination and listening skills
Time:	Component	Activity	Apparatus and set-up
Introduction:			
8min	Locomotor skills Spatial awareness Balance	Learners listens to teacher's instructions to perform different movements. Learners line up in teams and stand behind the line. Whole group must complete the movement through hoops and start behind the line again. 1. Run through hoops 2. Jump with 2 feet through hoops 3. Walk like an elephant through hoops 4. Bear walk through hoops 5. Hop like a rabbit through hoops	Hoops Learners line-up behind one another.
Lesson body:			
5min	Hand-eye-coordination	Learners hop ball on a line and catches the a ball	Ball, chalk Learners take turns, one at a time.
5min	Body awareness /coordination	Learner holds a ball above their heads while they climb over hurdles.	Ball, hurdles One learner at a time gets a turn to complete movement after finishing they stand in line again.
5min	Body awareness	Learner listens to instructions, to put which hand or foot on different colour shapes.	Shapes Each learner gets 3 turns, before next learner can go.

		Ex. Left hand on circle.	
5min	Balance	Learner walks over balance beam forward and back, while picking up objects next to beam.	Balance beam, beanbags One learner at a time gets a chance to complete activity.
5min	Hand-eye-coordination	Learners stand across (5m) from one another and underarm throw a beanbag to friend to catch.	Beanbags, cones 5m apart between each learner to catch beanbag
Conclusion/warm-down:			
10 min	Relay game	Learners are divided into teams. Learners stand behind one another, with space in between, with their legs wide. They must then transfer the ball, under legs, over head, under legs until finish and back to start. First team finish wins.	Balls 
Comments:			

Lesson 3			Aim of lesson: Focus on different movements
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Game “Simon says” Locomotion Body awareness	Teacher calls out instructions Simon says: Touch your head March Do star jumps Touch your right leg Hop 10 times Reach for the sky Run as fast as you can on one spot Shake your booty Learners stretch top to bottom	Learners stand in their own space in circle format.
Lesson body:			
5min	Dynamic balance	Learners walk on all fours over balance beam.	Balance beam Each learner walks over on at a time and stand behind each other.
5min	Spatial awareness	Learners zigzag run through bottle markers and then switch to climbing over bottle markers.	Bottles One learner at a time complete activity, learners stand behind one another.
5min	Body awareness/ coordination	Each learner has a hoop and uses it to skip or climb through if learner cannot skip.	Hoops, cones Learners stand next to each other and skip at same time to marked off cone.

5min	Spatial awareness	Learners run/walk a figure 8.	
5min	Foot-eye-coordination	Learners place beanbag on his/her foot and kick it up in air to catch. Learners alternate their feet.	Beanbag, cones Each learner stands at their own cone and beanbag and performs action.
Conclusion/warm-down:			
8min	Rock, paper, scissor shuttle relay	Learners are divided into two groups, and stands in two rows opposite one another. Two learners run to each other plays rock, paper, and scissor. The learner who loses must run to back and sit. Next to learners go.	Cones Cones 20m apart, each learner runs 10m to opponent to compete with.
Comments:			

Lesson 4			Aim of lesson: Different ways to move, balance and target.
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Locomotion	Learners march on the spot with rhythm, learners must watch the teacher which shows direction with arms they must march to, either forward, backward, right and left. Learners stretch	Learners stand spread out in line formation.
Lesson body:			
5min	Spatial awareness/ coordination	Learners side shuffle a long a line one at a time. Forward and then back	Skipping ropes, cones Stand behind each other and each learner gets a turn
5min	Spatial/body awareness	Learners perform hop scotch movement which is drawn on ground.	Chalk Learners stand behind each other and one learner at a time goes.
5min	Balance	Walk on toes over line and then the rope shaped into a shape.	Rope  1 2
5min	Hand-eye-coordination	Learners throw at a target with beanbags. Target is bottles standing next to each other. Learner gets 3 turns, and then next learner goes.	Target bottles, cones Learners stand behind each other, one learner at time goes.
5min	Spatial awareness	Learners bear crawl over objects and then skips back.	Cones, boxes, hurdles. Learners stand behind each other, one learner at time goes.

Conclusion/warm-down:			
8min	Team relay “run through my legs”	Learners divided into two groups. Learners sit on the ground next to each other, with legs spread apart, the learner in the front stand up and run through the learners legs till the end sequence are repeated until marked spot. First team finished, wins.	Cones Learners must have enough space so that they do not step onto another learner’s leg. Legs wide while sitting next to each other in a line.
Comments:			

Lesson 5			Aim of lesson:
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Game “How many” Locomotive	Learners are given instructions by the teacher, first they are divided in two groups, and one group at time goes. Teacher calls out how many eg. Red beanbags can you touch with your left hand, learners must run and touch as many red beanbags as they can. When they finished the other group gets a chance. Learners stretch top to bottom.	Beanbags different colours Beanbags are spread over an open area, learners stand on side-line until they receive the instruction to run and touch.
Lesson body:			
5min	Balance	Learners walk over balance beam and then over a rope.	Balance beam, rope One learner at a time, learners stand behind each other.
5min	Spatial awareness	Learners hop one leg through hoops and alternate legs.	Hoops One learner at a time, learners stand behind each other.
5min	Hand-eye-coordination	Learner stand between cones, they must first hop catch a ball and after throw it up in the air and catch it again.	Cones, ball 
		Learners hop over hurdle and climb back	Hurdles

5min	Spatial awareness/coordination	over, learner alternate by hopping sideways over hurdle.	Each learner stands at their own hurdle.
5min	Foot-eye-coordination/rhythm	Learner stands with one foot on a soccer ball and then hops so that other foot is on the ball, learner foot must stay on ball, also find the correct rhythm.	Soccer ball Each learner stands at their own soccer ball.
Conclusion/warm-down:			
8min	Ball relay game	Learners divided into teams 5 groups. One learner of each group must run to the other side to put one ball in a bucket, they run back and stand at back so that next learner can go, until all the balls are in the bucket.	Balls, cones and bucket. Learners stand behind each other in a line, runs 20 m to put ball in bucket and run back. Groups stand next to each other in one line.
Comments:			

Lesson 6			Aim of lesson: Focus on body in space and to find balance
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Cat and mouse game Locomotive Hand-eye-coordination Spatial awareness	Teacher chooses randomly 2 cats from group of learners, the rest of learners are mice and each mouse has a ball that they must hop catch but at same time protect it from the cat. If the cat gets a ball, then that learner who lost his/her ball becomes the new cat. Learners stretch.	Balls Open areas for learners to hop catch their ball.
Lesson body:			
5min	Body awareness/midline crossing	Learners walk through hoops by crossing their legs.	Hoops Learners stand behind each other one at time goes through hoops.
5min	Balance circuit	Learners hop scotch, then twirl movement on a line and then walk heel to toe on a straight line.	Chalk Learners stand behind each other and one at a time goes.
5min	Balance	Learners jump with one foot on beanbags to get to the other side, they are not allowed to step off beanbags.	Beanbags Learners stand behind each other and one at a time goes.
5min	Foot-eye-coordination	Learners dribble with ball through cones.	Cones, soccer ball One learner at a time dribble with ball, while others wait in a line.

5min	Body awareness	Learners crab walk from point A to B and back.	Cones Cones 5m apart and learners stand behind each other.
Conclusion/warm-down:			
5min		Learners stretch and focus on breathing.	Learners in circle formation
Comments:			

Lesson 7			Aim of lesson: Focus on balance and improving balance.
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Spider trap game Locomotive	Teacher is the spider, and there can be more than one spider - a learner can also be a spider. Learners must run around to avoid being caught by spider feet (noodles), if they get caught, they must stand still, and 5 star jumps to be free from trap. Stretch top to bottom.	Noodles Learners are in open space and can be divided into two separate groups, depending on available space.
Lesson body:			
5min	Body awareness	Frog jumps through hoops.	Hoops Learners go one at a time and wait in a line.
5min	Balance	Learners walk over noodles, balance while walking.	Noodles Learners go one at a time and wait in a line.
5min	Balance	Learners balance on one foot while bending forward to pick up beanbag. Learners alternate their legs.	Beanbags Each learner stands by their own beanbag.
5min	Balance	Learners walk on stilts from A to B.	Stilts 3 learners at a time, depending on how many sets of stilts.
5min	Spatial awareness	Two learners at a time skip with ropes while moving while the other learners stand still and skip, the two	Skipping ropes, Cones Marked off area and open area for still standing skipping.

		groups alternate by moving and standing still.	
Conclusion/warm-down:			
8min		Move(slow), freeze, stretch.	
Comments:			

Lesson 8			Aim of lesson: Explore different ways of body moves and coordination.
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Ball pass relay Body awareness Hand-foot-coordination	Learners divide into groups, then sit next to each other with enough space which allows them to move with their legs. Learners must then transfer ball from one side to other side only using their feet. First team finishes, wins.	Balls, cones Learners sit in line next to each other. Starting at same point.
Lesson body:			
5min	Hand-eye-coordination	Learner bounce and catch ball while moving around the hoop, ball must hop inside the hoop.	Hoops, balls Each learner stands at their hoop with own ball.
5min	Body awareness/midline	Learners stand on their all fours, with their stomach facing upwards, they must then reach their one hand to opposite leg and alternate movement.	Learners in own space.
5min	Spatial/body awareness	Learners jump over a moving jumping rope, from one side to the other.	Jumping rope tied together. One learner at a time goes.
5min	Hand-eye-coordination	Learners dribble with hockey stick to shoot ball through a target.	Sticks, cones, balls One learner at time, when finished, they

			quickly give the stick to next learner in row.
5min	Coordination	Learners stand in a circle with noodle in hand, they must catch the noodle from the learner next to them, when they let it go, learners move in circle formation while performing.	Noodles Learners stand in circle
Conclusion/warm-down:			
8min	Throw the beanbag game	Divide learners into groups of 4 or 5. Each group with heap of beanbags. Each group must transfer as many beanbags as they can in 30 seconds from point A to B, but each learner is only allowed to carry one beanbag. Team that has most beanbags wins. Give more than one try.	Beanbags, hoops Groups stand next to each other with enough space between them. Each teams' learners stand behind each other.
Comments:			

Lesson 9			Aim of lesson: Moving in different directions, finding rhythm and coordination in activities.
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Open the gate game Locomotive	Learners can be divided into two separate groups. One tagger or 3 depends on group. Learners stand on one side of the court/field. Learners must try to get pass the tagger if learners gets tagged he/she must go back to start. The aim is for all the learners to get to other side of court/field. Learners can go more than once.	Open space
Lesson body:			
5min	Hand-eye-coordination	Learners stand behind a line to aim at a target board, to throw a beanbag through a hole.	Target board, beanbags Learners stand behind line, behind each other, one learner at a time, gets 3 tries.
5min	Hand-eye-coordination	Learners stand across from one another (10m) and hop and catch the ball for each other.	Balls, cones
5min	Balance	Learners balance on higher beam moving slowly sideways.	Beam Learners stand behind each other, only one at time.

5min	Hand-eye-coordination	Learners dribble/hop with ball after which they have to throw it through a hoop.	Ball, cones, hoop One learner at a time and stand behind each other.
5min	Coordination/rhythm	Learners must do a in/out movement through agility ladder.	
Conclusion/warm-down:			
8min	Transfer the hoop game	Learners stand in a circle by holding hands, they must then transfer the hoop by only using their bodies and by not letting their hands go. More than one hoop can be inserted.	Hoops Learners stand in circle formation.
Comments:			

Lesson 10			Aim of lesson: Different ways to move and use body and parts to perform certain action.
Time:	Component	Activity	Apparatus and set-up
Introduction:			
10min	Dance Locomotive	Learners stand in a line formation with enough space. They listen to the song (Cha-cha dance song) and must do the movements. Can be repeated more than once.	Speaker, song Learners stand in-line behind each other.
Lesson body:			
5min	Spatial awareness	Learners run through hoops, which is closely and packed over each other. Learners should not step onto hoops but open spaces.	Hoops One learner at a time and stand behind each other.
5min	Body/spatial awareness	Learner stands and does a cartwheel over packed cones.	Cones Open space each learner stand by his/her own cones.
5min	Hand-eye-coordination	Learners stand 5m away from bottle and must aim to throw beacon over bottle cap.	Bottle, cones Each learner at their own bottle.
5min	Balance	Learners walk over higher beam forward and slowly backward (assisted help).	Beam One learner at a time on beam.
5min	Spatial/body awareness	Learners must do bunny hops through hanging hoops.	Hoops, rope One learner at a time.

Conclusion/warm-down:			
8min	Freeze ball pass game and stretch	Learners stand in circle and pass a ball for learner next to you as soon as whistle goes learners must freeze in a different movement eg. Catching a ball. Continue for few rounds. Stretch top to bottom	Ball, whistle Learners stand in a circle formation.
Comments:			

Addendum M: Principal permission letter

INDEPENDENT SCHOOL **ESTABLISHED 1993**

ED U COLLEGE QWA QWA
LEFIKA, MABOLELA VILLAGE, QWA QWA
P.O BOX 1932 BETHLEHEM 9700
TEL/FAX 058 050 0989 or 058 050 0987
EMAIL: admin@educollegeqwaqwa.co.za

28 February 2020

TO WHOM IT MAY CONCERN

As the Chair of the directorate of Ed-U-College Qwa Qwa, I give permission to Ms. S. Van Zyl to conduct the i-Move programme with the Grade 1 learners at the above mentioned school.

This programme may also be used to collect data for her Master's Degree which she is currently busy with.

If you have any concerns/questions, you are welcome to contact me at 082 825 7231.

Yours faithfully

MR. P.J. BOOYSEN
CHAIR OF THE DIRECTORATE
ED-U-COLLEGE QWA QWA

ASSOCIATION INCORPORATED UNDER SECTION 21 – REG NO 9511532/28
ACCREDITED BY THE UMALUSI COUNCIL FOR QUALITY ASSURANCE – UMALUSI SCHOO250
SCHOOL REG NO 441701191 (PRIMARY SCHOOL) 441701192 (HIGH SCHOOL)
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DIRECTORS: P.J BOOYSEN (MANAGING) E.E. BOOYSEN, H.S HEUNIS, J.S MTHEMBU

Addendum N: Letter of ethical approval

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North-West University Education, Management and Economic Sciences, Law, Theology, Engineering and Natural Sciences Research Ethics Office (NWU-EMELTEN-REC)
Tel: +2718 299 4707
Email: lukas.meyer@nwu.ac.za

10 September 2019

Dear Prof D du Toit

NOTIFICATION: APPROVAL OF YOUR APPLICATION BY THE NWU-EMELTEN-REC

Ethics number: NWU-00630-19-S2

Kindly use the ethics reference number provided above in all correspondence or documents submitted to the NWU-EMELTEN-REC secretariat. Please provide the ethics office an electronic copy of your final ethics application. Upon the receipt of the documents, a final approval letter will be issued.

Study title: The effect of a Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

Study leader/supervisor: Prof D du Toit

Student: Ms. S van Zyl

Application type: Single study

Risk level: Greater than minimal but provides the prospect of direct benefit

You are kindly informed that your application was reviewed at the meeting held on 10 June 2019 of the NWU-EMELTEN-REC and was approved on 19 August 2019.

The commencement date for this study is 19 August 2019 dependent on fulfilling the conditions indicated below. Continuation of the study is dependent on receipt of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation up to a maximum period of one year when extension will be facilitated during the monitoring process.

After ethical review:

Translation of the informed consent document to the languages applicable to the study participants should be submitted to the NWU-EMELTEN-REC (if applicable).

The NWU-EMELTEN-REC requires immediate reporting of any aspects that warrants a change of ethical approval. Any amendments, extensions or other modifications to the proposal or other associated documentation must be submitted to the NWU-EMELTEN-REC prior to implementing these changes. Any adverse/unexpected/unforeseen events or incidents must be reported on either an adverse event report form or incident report form.

A monitoring report should be submitted within one year of approval of this study (or as otherwise stipulated) and before the year has expired, to ensure timely renewal of the study. A final report must be provided at completion of the study or the NWU-EMELTEN-REC must be notified if the study is temporarily suspended or terminated. The monitoring report template is obtainable from the NWU-EMELTEN-REC Office at Ethics-EMELTEN-mon@nwu.ac.za. Annually a number of studies may be randomly selected for an external audit.

Please note that the NWU-EMELTEN-REC has the prerogative and authority to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process.

Please note that for any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the NWU-EMELTEN-REC Office. Ethics approval is required BEFORE approval can be obtained from these authorities.

The NWU-EMELTEN-REC complies with the South African National Health Act 61 (2003), the Regulations on Research with Human Participants (2014), the Ethics in Health Research: Principles, Structures and Processes (2015), the Belmont Report and the Declaration of Helsinki (2013).

We wish you the best as you conduct your research. If you have any questions or need further assistance, please contact the NWU-EMELTEN-REC Office at Ethics-EMELTEN@nwu.ac.za.

Yours sincerely

Prof Lukas Meyer

Chairperson NWU-EMELTEN-REC

Original details: C:\Users\22139500\Google Drive\8. Research and postgrad education\8.1.5 Ethics\NWU-00530-19-S0\Final\8.1.5.4.1_Approval notification

Date: 10 September 2019

File Reference: 8.1.5.4.1

Addendum O: Language editing declaration

Language Editing Declaration

20/02/2020

With this I, Elma van Wyk, SATI member no. 1002646, declare that I have conducted the language editing of various chapters forming part of the dissertation to be submitted in fulfilment of the requirements for the degree Master of Education in Physical Education at the North-West University, by Simoné van Zyl, with the title:

The effect of a quality Physical Education programme on the perceptual-motor skills of Grade 1-learners in a primary school in South Africa

Chapter 1: delivered 4/11/2018, length 6000 words

Chapter 2: delivered 20/09/2019, length 3731 words

Chapter 3: delivered 09/10/2019, length 3038 words

Chapter 4: delivered 12/11/2019, length 3592 words

Chapter 5: delivered 22/01/2020, length 3372 words

Chapter 6: delivered 28/01/2020, length 1855 words

Thank you for your patronage.

Signed:__ _____ Date: 20-02-2020

Addendum P: Turn-it -in report

12923028:S_van_Zyl_Hele_Meesters_f.docx

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