Environmental modifications in grade two classrooms of learners with learning disabilities

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Occupational Therapy

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DECLARATION

I, Samantha Claire Smith declare that this research report is my own work. It is being submitted for the degree of Master of Science in Occupational Therapy by coursework and research report in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

…….

……day of ……., 2013

DEDICATION

This research report is dedicated to all those learners with learning disabilities that are continually challenged by their barriers to learning. May their academic journeys be filled with accommodating professionals that automatically minimise their barriers to learning and foster a passion for learning.

ABSTRACT

Inclusive education policies in South Africa aim to reduce the barriers to learning of learners with learning disabilities (LDs).[1] Occupational therapists play an important role in identifying these barriers and collaborating with the educators to implement environmental modifications (EMs) in the classroom to enhance the academic performance of learners. This study aims to explore the use of as well as the effectiveness of EMs in grade two classrooms of learners with special education needs (LSEN) schools in the greater Johannesburg area. Eight semi structured interviews were conducted. The qualitative data was analysed using priori categories based on a framework provided by Mulligan[2].

A wide variety of EMs were identified by the participants, indicating the effectiveness of the modifications used. In conclusion the EMs were more concisely divided into three categories, namely behavioural modifications, physical modifications and modifications to the delivery of the curriculum, demonstrating a diverse interrelationships between the categories.

Keywords: Occupational therapy, learning disabilities, environmental modifications, classroom environment, LSEN schools

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OPERATIONAL DEFINITION OF TERMS

Learning disabilities: Learning disabilities have been defined as significant difficulties in reading, spelling, arithmetic (mathematics), and/or written language in spite of average or above-average intelligence.[3]

Environments and contexts: Environments exist within a variety of contexts. Contexts take into account factors both internal and external to an individual. However, for the purpose of this research only those aspects that refer to the external components of the context will be included. Environments and contexts therefore together form the aspects external to the person and in turn impact the individual's performance.[4]

Physical environment: The physical environment consists of the natural and built environments as well as the objects in these environments.[4]

Social environment: The social environment is the existence, relationships and expectations of others within the environment.[4]

Cultural context: The cultural context refers to the beliefs, behaviour standards, activity patterns and expectations of the society.[4]

Temporal context: The temporal context is defined by the rhythm of activity, time of day or year as well as the duration of activity.[4]

Virtual context: The virtual context relates to interactions absent of physical contact.[4]

Environmental modifications: Modifications or assistive technologies are products or services that assist individuals with special needs to perform or improve their performance in tasks that they would otherwise be unable to perform adequately.[5-7] Modifications to the physical and social classroom environment, in terms of the social, cultural, virtual and temporal contexts therefore enhances the academic performance of learners with special education needs in the classroom. These modifications in the classroom can take the form of behavioural modifications, physical modifications, sensory modifications, curriculum modifications and modifications to the delivery of the curriculum.

Behavioural modifications: Behavioural modifications are used to regulate learners behaviours, in order to improve their academic performance in the classroom.[8] These modifications are typically implemented to address undesirable behaviours as well as enforce appropriate classroom behaviours.[2]

Physical modifications: Physical modifications are adaptations to the physical environment of the learner in order to limit distractions, compensate for skills deficits or barriers to learning as well as restructure the physical environment to enhance learning.[2] Mulligan(2) referred to these modifications as environmental modifications, but to eliminate confusion in this study they will be referred to as physical modifications.

Sensory modifications: Sensory modifications are used to provide different sensory stimuli that allow for appropriate maintenance of an optimal state of arousal for learning in the classroom.[2]

Curriculum modifications: Curriculum modifications are made to the curriculum in order to enhance a learner's interest and attention to the task, and are not modifications to the core structure of the curriculum.[2]

Modifications to the delivery of the curriculum: Modifications to the delivery of the curriculum incorporates changes to the teaching style, the ways in which things are presented to the leaner as well as the classroom organisation and structure.[2]

ABBREVIATIONS

ADHD – Attention Deficit and Hyperactivity Disorder

EM - Environmental Modification

LD - Learning Disability

LSEN - Learners with Special Education Needs

OTPF II - Occupational Therapy Practice Framework: Domain and Process 2nd Edition

PEO – Person Environment Occupation

CHAPTER 1: INTRODUCTION

1.1 Introduction

Learners with learning disabilities (LDs) are recognised as learners with mild disabilities that demonstrate under achievement at school in spite of average or above-average intelligence.[9-10] They present with problems identified by their educators which include being untidy, awkward and clumsy as well as struggling to concentrate, follow instructions or stay seated.[11] In South Africa the Education White Paper 6: Special Needs Education[1] highlights strategies for developing an inclusive education for learners who experience barriers to learning, including those learners with LDs. The aim for inclusive education is to identify the barriers to learning that these learners experience and provide intervention to address and respond to the diverse needs of these learners, therefore increasing their participation in the classroom. This includes providing effective modifications to teaching systems, environments and curricula.[1]

Occupational therapists play a key role in evaluating and compensating for a learner's barriers to learning. They are responsible for evaluating a learner's participation in the classroom, in terms of the learner's motor, sensory and cognitive skills and providing interventions in the academic occupational performance area.[12] One of the occupational therapy models used in this context is the Person, Environment and Occupation (PEO) model. The PEO model describes occupational performance in the classroom as a consequence of the interaction of the learner's skills, the environmental factors, as well as the occupation the learner is engaged in.[13] Success and achievement are dependent on how closely these components described in the PEO model interact.[13] It is therefore vital, in relation to a learner with LDs, that the occupational therapist focuses not only on the learner's skills and tasks they are engaged in, but also to the environment in which they perform school related tasks. By adjusting the environment or providing environmental modification's (EM), in order to compensate for the learner's dysfunction and decreased ability, participation in school related occupations is facilitated. [13]

The National Strategy on Screening, Identification, Assessment and Support: School Pack[14] aims to identify the levels of support needed for the learner whom experiences barriers to learning.

1.2 Statement of the problem

The aim of the Education White Paper 6[1] is to accommodate for the diverse range of learning needs in the already existing education system, which includes schools for learners with special education needs (LSEN). With the appropriate support, learners with moderate learning difficulties should be adequately accommodated in mainstream education. In order to accommodate for these learners there needs to be a shift in the attitude, behaviour, curricula, teaching approaches as well as the environment in order to meet each learners specific needs.[1, 9] Currently government documents and guidelines exist highlighting ways in which these modifications can be incorporated into mainstream education.[14-18]

Occupational therapists play an important role in maximising learners' ability to achieve and benefit from the learning opportunities in the classroom by directly addressing the needs of the learner.[13] Modifications to the classroom and learning environment can assist in enhancing the learner's academic performance. Through collaborative consultation with educators occupational therapists can facilitate the implementation of EMs in the classroom that will best address the needs of the learners. It is unknown as to what EMs are currently available and used in the education system, and more precisely in LSEN schools where more diverse and severe LDs exist. By approaching the educators directly an accurate view of these EMs can be assessed, determining which EMs are actively and realistically implemented in the classroom to improve learners' academic performance. This study will therefore focus on determining which EMs are used to improve the academic performance of grade two learners with LDs in LSEN schools as well as the perceived effectiveness of those EMs.

1.3 Research question

What EMs do educators use to improve the academic performance for learners with LDs in grade two at LSEN schools in Johannesburg, how are these implemented and what are the educators' perceptions of the effectiveness of these EMs?

1.4 Purpose of the study

The purpose of this study is to evaluate which EMs are actively and realistically implemented in grade two classrooms in LSEN schools for learners with LDs to improve the academic performance of the learners. Occupational therapists work in collaboration with educators to implement EMs into the classroom in order to meet each learner's specific needs.[13, 19] The

current implementation of EMs in the classrooms can therefore be evaluated by investigating what EMs are used by educators at LSEN schools who currently work in collaboration with occupational therapists.

1.5 Aim of the Study

To explore the use and perceptions of EMs used by educators to improve academic performance of grade two learners with LDs in LSEN schools.

1.6 Objectives of the study

The objectives of the study are to determine:

- which EMs are used to improve academic performance for learners with LDs in grade two at LSEN schools;
- how EMs are implemented in grade two classrooms at LSEN schools in order to improve learners' academic performance; and
- which EMs are deemed effective or have proven to be ineffective in the past by the educators of grade two learners with LD at LSEN schools.

1.7 Justification for the study

In order to make recommendations for possible EMs that can be used in collaboration with the educators in the classrooms for learners with LD, occupational therapists need to have an understanding of the current EMs used as well as their perceived effectiveness. By exploring what EMs are used in the classroom of learners with LDs occupational therapists will be able to recommend EMs that can meet the needs of specific learners. The perceived effectiveness of these modifications can also impact which EMs are suggested by the occupational therapist.

1.8 Assumptions

Educators make EMs in the grade two classrooms for learners with LDs in order to facilitate the performance of grade two learners in LSEN schools.

1.9 **Conclusion**

By providing EMs for learners with LDs their participation in school related occupations can be optimised, reducing their barriers to learning.[13] It is currently unknown what EMs are used in South African schools for learners with LDs and more specifically, within the greater Johannesburg area. This study aims to explore the use and effectiveness of EMs in LSEN schools for learners with LDs. An examination of the available literature will provide an in depth perspective of the implementation of EMs for learners with LDs.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review discusses background information on LDs, legislation on LDs in education in South Africa and the role of educators and occupational therapists in implementing EMs to facilitate learning in LSEN schools. A variety of EMs will be investigated through reviewing the literature and classified into categories according to research performed by Mulligan[2].

2.2 Learning disabilities

Learning disabilities are a diverse group of disabilities, originating from neurological complications, resulting in difficulties in understanding, perceiving and using language or mathematical concepts.[19-20] Typically, LDs are divided into verbal LDs and non-verbal LDs. Learners with a verbal LD typically display difficulties in language skills, such as dyslexia or specific language impairment, where learners with non-verbal LDs display difficulties with visual-spatial skills, such as dyscalculia.[20] Attention difficulties often accompany LDs, and thus an additional subtype of attention dysfunction can exist parallel to verbal and non-verbal LDs.[13, 20] Motor dysfunction may also be associated with attention difficulties and thus a subtype which comprises of both attention difficulties with motor dysfunction, such as Attention Deficit Hyperactivity Disorder (ADHD) has been defined.[20] However, LDs are a diverse group of disabilities, where it is important to remember that each learner can present with a variety and exclusive combination of difficulties.[21]

A diagnosis of LD is not made in the presence of primary sensory insufficiencies such as being blind or deaf, having intellectual impairment or motor deficits such as cerebral palsy.[20] It is also not the consequence of a lack of learning opportunities, psychosocial impairment or socioeconomic conditions.[13, 19-20] Usually learners with LDs have an average or above average intelligence but discrepancies are evident between the learner's performance and their perceived potential in academic tasks, when suitable learning opportunities are made available to them.[10, 13]

Difficulties concentrating or paying attention is a common difficulty encountered by learners with LDs, where these learners are easily distracted. When engaging in the classroom

learners are expected to demonstrate both the ability to maintain sustained focus on tasks as well as shift their attention between certain tasks, redirecting their attention towards a new task.[22] The concept of joint attention or shared attention between two or more learners is also important in the classroom as it also involves an aspect of social behaviour.[22]

Carte, Morrison, Sublett, Uemura and Setrakian [23] reported that 70% of learners with LDs are diagnosed with sensory integration dysfunction. Sensory integration is the brain's ability to organise the incoming sensory information from the sensory systems in order to engage with the environment.[19, 24] Sensory input is received from the visual, auditory, olfactory, tactile, gustatory, proprioceptive and vestibular systems.[24-25] Difficulties in processing sensory information are thought to result in the learner producing ineffective actions in the environment, affecting his/her behaviour and ability to learn.[19] In a study done by Cook[26] in South Africa, the behaviour of learners with ADHD, a subtype of LDs, was found to characterise poor sensory processing. Reynolds and Lane[27] discuss the co-morbidity of sensory overresponsivity in ADHD. These learners are over responsive to the different sensory stimuli, and may therefore present with aggression, irritability, withdrawal, fear and difficulties maintaining an optimal level of arousal.[27] In contrast Bundy, Lane and Murray[19] also describe sensory underresponsivity as a learner's failure to respond to sensory experiences in the way it would be expected, appearing dulled or inattentive. Difficulties in self-regulation exist when a learner struggles to regulate their level of arousal independently, therefore struggling to maintain an optimal level of arousal for school based tasks, affecting their engagement and ability to focus.[19, 28] Difficulties in sensory discrimination may affect a learner's ability to execute motor movements. Learners with decreased proprioceptive and vestibular discrimination can exhibit poor balance and poor posture resulting in constant moving which affects their ability to engage and attend in their environment.[29] Motor planning difficulties are present when learners have difficulty discriminating predominantly tactile and proprioceptive inputs, commonly presenting with difficulties executing fine and gross motor skills.[19] A wide variety of sensory integration dysfunctions exist impacting a learner's ability to engage and participate in the classroom, resulting in barriers to learning if these are not adequately addressed.

Learners with LDs therefore have a variety of difficulties, some of which include difficulties concentrating, co-ordinating their movement, following instructions, remembering information, staying seated or coping with classroom rules. [13, 21] They therefore exhibit difficulties acquiring and applying the skills necessary for speaking, listening, writing, reading,

mathematics and/or reasoning.[13] Their ability to execute school related tasks is therefore reduced, identifying barriers to learning.

Secondary problems arise from the difficulties experienced in academic performance, and the learner may develop decreased self-esteem, behaviour or social problems, possibly even dropping out of school.[20] Early intervention is therefore essential in developing the learner's coping skills and promoting successful academic engagement. In South Africa the implementation of this intervention has been addressed by legislation on special needs education.

2.3 **Learning disabilities in South African LSEN schools**

The Education White Paper 6: Special Needs Education[1], was developed with the aim to ensure the provision of non-discrimination and equal educational opportunities to all learners, more specifically focusing on learners experiencing barriers to learning and development. These learners should be included in the already established educational services which should facilitate maximum participation of the learners.[1] The Consultative Paper No. 1 on Special Education: Building an Inclusive Education and Training System released in 1999 states that learning disabilities are a result of the education system rather than the learner themselves[1], where individual learning needs were not sufficiently met. In order to achieve the goal of inclusion it is essential to identify these barriers to learning early, creating a shift in the attitude, behaviour, curricula, teaching approaches as well as changes in the environment in order to meet each learners specific needs.[1, 9] According to the Education White Paper 6 the education and training system is required to accommodate for the variety of learning needs of the learners in the education system. If a learner is not suitably placed in a mainstream school, placement to a school with appropriate resources, such as an LSEN school is recommended.[14]

Learners strengths should be developed empowering them to participate actively and critically in their learning experience.[1] In 2011 the Guidelines for responding to learner diversity in the classroom through Curriculum Policy and Assessment Statements[16] was released. Additional documents such as the Guidelines for Full-service/Inclusive Schools[18], Teacher's Guide for the Development of Learning Programmes[15] and Guidelines to Ensure Quality Education and Support in Special Schools and Special School Resource Centres[17] currently exist to assist educators with implementing inclusion strategies in schools.

According to the Education White Paper 6: Special Education Needs[1] the key to reducing the barriers to learning for learners with learning difficulties is to strengthen the education support services. These support services include those support services currently located at special schools, such as occupational therapists.[1] The role of these support services is to maximise the learners ability to achieve and benefit from the learning opportunities thereby directly addressing the needs of the learner.[17] Bundy, Lane and Murray [19] highlight the importance of occupational therapists consulting with the educators, taking on a case centred and collaborative approach. In research conducted by Bose and Hinojosa[30] it was found that occupational therapy and educator collaboration is highly valued in providing successful school based intervention. It is vital that the occupational therapy intervention takes on an educationally relevant approach[19] minimising the barriers to learning through modifications or adaptations to the learning environment.

2.4 **Occupational therapy and the environment**

The role of the school based occupational therapist is to facilitate the learners performance in school based tasks in order for the learner to benefit from the learning experience.[12] By supporting the learner's efforts within the academic environment the learner is able to be as functional as possible.[13] By understanding each learner's individual needs and how these needs can be met and optimally managed in the classroom environment will ultimately reduce the barriers to learning and improve their functionality. The occupational therapy intervention strategies are developed through analysis of the learners skills, the activities he/she participates in as well as the environment these tasks are carried out in.[13]

The inter-relationship of these three components, the person, occupation and environment are vital in the outcome of occupational performance, as depicted in the Person-Environment-Occupation (PEO) model (Figure 2.1).[13] The better the fit of these three components, the more optimal the leaner's performance will be in the specified occupation or activity, and vice versa.[13] Thereby limiting barriers in any of these three components will in turn maximise the learner's performance.

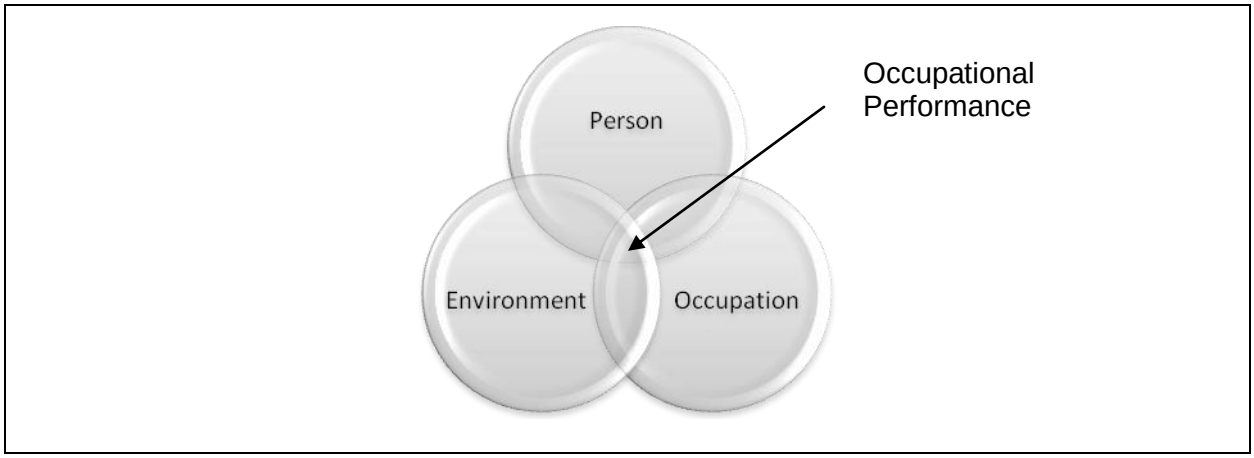

Figure 2.1 Person-Environment-Occupation Model

In a study performed by Cable and Case-Smith[31] occupational therapists reported that direct intervention in the classroom together with consultation with the educator was the most beneficial form of intervention, best addressing the learner's needs. By working in the classroom the therapist is able to gain an understanding of how the educator has organised the classroom environment, as well as the academic and behavioural expectations set within the classroom.[13] The occupational therapists could then intervene to assist in maximising the environment for individual learners according to specific outcomes identified.

Context and environment are often used interchangeably in the literature, referring to factors external to the person.[4] The Occupational Therapy Practice Framework: Domain and Process 2nd Edition (OTPF II)[4] defines the context and the environment as separate interrelated components, in order to emphasise the wide variety of external factors affecting performance.[4] According to the OTPF II the environment consists of the individual's physical and social surroundings whereas these can be analysed in relation to contexts which consist of cultural, virtual, temporal and personal aspects.[4] The physical environment consists of the natural and built environments as well as the objects in these environments, where the social environment is the existence, relationships and expectations of others within the environment.[4] The cultural context refers to the beliefs, behaviour standards, activity patterns and expectations of the society; the temporal context is defined by the rhythm of activity, time of day or year as well as duration of activity and the virtual context is interactions absent of physical contact.[4] The personal context relates to internal components of the person.[4] When reviewing these components in terms of the PEO model, the following components

would be included as part of the environment; physical environment, social environment, cultural context, temporal context and virtual context. The personal context would form part of the person, in terms of the PEO model, and is therefore does not form part of the environment.

In the classroom the learner's environment influences which occupations they choose to engage in, the accessibility of occupations, the quality of engagement in occupation as well as the satisfaction of participation in occupation.[4] The success of occupational engagement may be dependent on the environment in which the learner is engaging and should this environment be modified appropriately this may assist the learner to achieve success.[4] By modifying different aspects of the environment the barriers to learning for learners with LDs are reduced, therefore improving their occupational performance and participation in academic tasks.

2.5 **Environmental modifications**

Various authors describe the use of different EMs in the classroom. Gardill and DuPaul[8] performed a review of the literature relating to classroom strategies for managing learners with ADHD. These strategies involved modifications to the physical structure of the classroom or task as well as direct teacher intervention in relation to the learners behaviour and cognitive-behavioural strategies.[8] Walton, Nel, Hugo and Muller[32] conducted a study on the extent and practice of inclusion in independent schools in South Africa, where 106 questionnaires were analysed. The following strategies for learners experiencing barriers to learning were commonly used; modifying the classroom environment, extra time, concessions for spelling and handwriting, co-operative learning, modification of assessment tasks by reading to the learners or doing verbal assessments as well as teaching to a variety of cognitive styles.[32] The use of assistive devices, multi-media, personal organisers, word processors and non-standardised reports were found to be used less often.[32]

No literature could be found on the specific use of strategies which include modifications to the physical and social environments and other contexts in South African schools. A classification and a description of the use of modifications has however been published by Mulligan[2] who studied environmental aspects that can be modified in the classroom for learners with ADHD in America. Mulligan[2] performed a survey, developed through reviewing the literature, on 168 teachers in order to identify which classroom strategies were used by teachers of learners with ADHD. According to Mulligan[2] most of the strategies included in

the survey were beneficial for learners with ADHD, emphasising that the use of consistency and structure as well as providing guided movement opportunities were often more effective than cognitive-behavioural approaches.

Mulligan's[4] classification of these strategies can be directly related to the environmental and contextual components defined by the OTPF II. Behavioural strategies relate to the social environment and the cultural context, environmental modifications deal with the physical environment, sensory-motor strategies are associated with the physical environment and temporal context, curriculum modification covering the virtual and temporal contexts and finally modifications in the delivery of the curriculum relate to the temporal context and social environment.[2] Mulligan's categories clearly link to both the OTPF II as well as the environment component of the PEO model, but to limit confusion in terminology Mulligan's category 'environmental modifications' will be referred to as physical modifications.

Modifications to the classroom environment in this study are therefore classified into different categories namely, behavioural modifications, physical modifications, sensory modifications, modifications to the curriculum and modifications to the delivery of the curriculum.

2.5.1 **Behavioural modifications**

Behavioural modifications can be useful in regulating learner behaviours, in order to increase learners attention to task as well as improving their academic performance.[8] Mulligan[2] described behavioural modifications as typically being implemented to address disruptive behaviours, teach study skills, as well as enforce appropriate classroom behaviours.

Bundy et al[19] describes the role of the occupational therapist in reframing the behaviour of the learner. The teacher may have a view or frame of the learner as being immature, disorganised, disruptive or overactive, and this therefore frames the way they react to the learners behaviour.[19] By explaining and reasoning the learner's behaviours, modifications can be employed that will lessen the problem behaviours.[19] This is supported by Assink, Rouweler, Minis and Hess-April[33] who describe the importance of identifying the problem, the target behaviour and then deciding on the strategies to modify the behaviour, which may be negative or positive. Both positive and negative reinforcements are reportedly used in order to reduce ineffective behaviours or to enhance desired behaviours.[2]

The use of positive and negative reward systems is extensively discussed in the literature. In a review of the literature Gardill and DuPaul[8] recommend the use of positive reward

systems, such as token economies (such as sticker charts), in order to promote socially appropriate behaviour as well as academic performance. Placing a reward token system in the view of the learner, such as in the front of the class, encourages the frequency of self-monitoring.[34] Positive reinforcement is seen to improve the learner's self-esteem and worth.[33] It is often deemed by literature as the most effective behavioural strategy.[34]

The concept of negative reinforcement is controversial in the literature, often found as being ineffective.[34] Gardil and DuPaul[8] suggest that the punishment should be given immediately and consistently. This can take the form of direct and brief reprimands, a loss of privileges or time out.[2, 8] Although time out has also been criticised by literature, specifically if the reasoning for this is misinterpreted by the learner.[34]

The effect of seating arrangements on the modification of social behaviour in the classroom has been described by a number of authors[8, 19] although Fernandes and Huang[35] in their study found no significance between seating arrangement and learner participation or behaviour. However, Carbone[34] and Bundy et al[19] suggest that it is best to place a learner with attention difficulties at the front of the class, to increase their participation in the classroom. Other modifications that are used in relation to the placement of learners in the classroom include, placing a learner that requires regular feedback near the teacher, avoiding potentially distracting areas for children with attention difficulties, as well as placing learners that require movement breaks at the back of the classroom as not to distract other learners.[34]

A learner that requires behavioural intervention may benefit from being placed close to the teacher, or next to a peer model.[8, 33] By placing the learner close to the teacher the learner is benefited by regular monitoring or assistance.[34] Peer-mediated interventions have also proven to be effective through modelling appropriate behaviour, monitoring behaviour and providing organisational cues.[8] Positive peer attention can influence the behaviour of learners, for example by placing attentive hardworking learners around a distractible or disengaged learner.[34]

Cognitive-behavioural strategies have also been mentioned in the literature to affect socially appropriate behaviours, but have not always been seen as being effective.[34] This approach emphasises the development of problem solving skills and self-control.[8] Bundy et al[19] suggest discussing the problem and solution to disruptive behaviours with the learner.

2.5.2 **Physical modifications**

Mulligan[2] describes environmental modifications as adaptations to the physical environment of the learner. Physical modifications can be made in order to limit distractions, compensate for skills deficits or barriers to learning as well as restructure the physical environment to enhance learning. Literature recommends modifications to the classroom seating arrangement, visual and auditory environments of the classroom, individual seating preferences, as well as a variety of assistive devices and modifications to the classroom tools and equipment.[2, 8, 19, 34]

Seating arrangement in the classroom was found to influence learners attention to task, and Gardill and DuPaul[8] reported that learners displayed better on-task behaviour when seated in circles as opposed to clusters or rows. Alternatively Carbone[34] recommends that the traditional row-seating position is more effective for learners with attention difficulties, due to the increased structure and predictability of the arrangement. When learners are placed in groups the distractions are thought to be increased.

Educators can limit the amount of distractions in the classroom by placing the learner in the least distracting area of the classroom or by providing a quiet area in the classroom.[2, 34] Placing a learner near potentially distracting areas with noise and movement such as near the pencil sharpener or windows should also be avoided.[34] Gardill and DuPaul[8] discussed that the use of cubicles in the classroom was previously used by educators in an attempt to limit the distractions in the environment. However, due to decreased empirical support of their effectiveness, many educators no longer use these in their classroom.

Noisy classroom environments, may affect a learners arousal level. Although Carbone[34] reports that not all noise is detrimental, where moderate levels of classroom noise can result in better performance and attention to task, such as running a fan or playing music.[34] Bundy et al[19] discuss how noise and lighting as well as other sensory aspects may play a role in distracting learners with sensory processing difficulties requiring modification to the sensory environment in order to optimise their level of arousal.

Reducing visually distracting stimuli on walls or decreasing bright lights and clutter has also been shown to have an effect on a learner's level of distractibility.[2, 19, 33-34] Bundy et al[19] suggests strategies that may assist with organisation and reduce clutter in the classroom, such as colour coding supplies to match their storage box, designing specific areas on the

desk of where books and stationery should be placed as well as organising the learner's work space. Carbone[34] also suggests the use of well ordered storage boxes for each learner's belongings.

Other physical modifications can be made to address correct seating or hand function to allow for optimal table top engagement. Smith-Zuzovsky and Exner[36] found that suboptimal seating position impacts a learner's ability to perform in-hand manipulation tasks, and therefore it is crucial that chairs and tables are the correct height for learners. Bundy et al[19] suggest that the following physical modifications be used in the classroom to assist with the learner's posture; wedges, pillows or beanbag chairs when seated on the mat, tilting of the table surface, the use of "t-stools", footrests and/or by applying a non-slip surface to the seat of the chair. Minimal evidence was available in the literature describing the effectiveness of the variety of seating modifications on academic performance. A few studies were however performed on the effectiveness of replacing chairs with balls in the classroom. Schilling and Schwartz[37] conducted a study on alternative seating for learners with autism. They found that the use of balls as opposed to chairs resulted in significant improvement in in-seat behaviour and engagement in the classroom. The reliability of the study was however effected by the small study sample. Bagatell, Mirigliani, Patterson, Reyes and Test[38] performed the identical study, also on a small study sample, but found that the use of balls instead of chairs was dependent on the learner's difficulties. Those learners with movement seeking behaviours demonstrated improved in-seat behaviours, although those learners with poor postural control were less engaged when sitting on the ball. When performing a single subject study, Schilling Washington, Billingsley and Deitz[39] found that a learner with ADHD demonstrated improvements in both in-seat behaviour and legible word productivity when seated on a therapy ball as opposed to a chair.

Bundy et al[19] describes a variety of other physical modification strategies that can be used for learners with handwriting difficulties. These include the use of pencil grips, tilted writing surfaces, carbon paper, grid or graph paper, dividing the page into columns and raised line paper. Specialised scissors can be used to assist those learners who struggle to cut.[19] In a review of the literature Asher[40] found no significant association between the provision of writing paper and grips and improved handwriting proficiency and performance thus questioning the efficacy of this type of modification. Asher[40] did however comment that the specific writing tool, grip or paper that the learner uses should be chosen in respect to the learners needs.

2.5.3 **Sensory modifications**

Although the effectiveness of sensory integration therapy is widely debated within the literature[24, 41-43], the sensory integration frame of reference is commonly used by occupational therapists with learners with learning disabilities.[21, 43] Sensory integration provides purposeful engagement in sensory based activities in an attempt to modulate the learner's sensory processing abilities enhancing the learner's behaviour and learning.[19, 24]

Although primary sensory integration therapy takes place in the therapy environment, a shift has occurred where therapists consult with educators in the classroom in order to reframe the understanding of the learners problems.[19] In consultation with the educators, occupational therapists implement modifications in the classroom that can assist by providing different sensory stimuli that allow for appropriate maintenance of an optimal state of arousal for learning in the classroom as well as assist with motor related sensory difficulties.[2]

Self-regulation strategies can be used to influence a learner's level of arousal enhancing their readiness to engage and learn in the school environment.[28] Occupational therapists may recommend a variety of sensory experiences in the classroom to assist with self-regulation. These may include chewing gum, jumping on a trampoline, sitting on a specialised cushion, fidget toys, playing soft music, dimming the lights and wearing a weighted vest.[2, 19] Bundy et al[19] also describes how chewing on gum or theratubing, as well as blowing activities can assist with stress reduction. The Alert Programme is a specific programme designed for learners with LD and ADHD to use in the classroom in order to promote the learner's independence in self-regulation.[28, 44] a variety of sensory inputs in terms of touch, movement, vision, auditory or oral may be used independently by the learners in the classroom environment to assist with self-regulation.[44] Barnes, Vogel, Beck, Schoenfeld and Owen[28] conducted a quasi-experimental pretest/posttest study on 12 learners in order to determine the effectiveness of the Alert programme for learners with emotional disturbances in the classroom setting. The results of the study showed that with the assistance of the Alert programme learners demonstrated improved abilities to self-regulate behaviour, focus on tasks, change tasks, cope with sensory challenges and organise themselves.[28]

Some learners struggle to self-regulate as a result of increased sensitivity to auditory stimulation. Occupational therapists may recommend the use of headsets to reduce auditory stimulation or recommend a quiet space in the classroom for learners to retreat.[19] The use of auditory sensory strategies has also been reported as being effective in assisting learners

with related behavioural difficulties. In a study performed by Hall and Case-Smith the therapeutic listening programme in combination with a sensory diet demonstrated significant improvement in learners' behaviours.[45] A study by Kinnealey, Pfeiffer, Miller, Roan, Shoener and Ellner[46] demonstrates how learners with auditory and visual sensitivities can benefit from the use of sound absorbing walls and halogen lighting in order to improve attention levels and engagement in the classroom.

The provision of proprioceptive and vestibular inputs may also assist with improving self-regulation and arousal levels in the classroom. Pfeiffer, Henry, Miller and Witherell[47] found that by providing learners with additional proprioceptive and vestibular input through the implementation of Disc 'O' Sit Cushions in the classroom the learner's self-regulation strategies and systematic problem solving improved, allowing greater attention to task. The use of weighted vests in the classroom can provide increased proprioceptive input and deep pressure while engaging in school based tasks without disruption of the normal classroom routine.[13, 48] Numerous studies have been conducted on the positive effect of using weighted vests in the classroom.[48-51] Buckle, Franzsen and Bester[48] performed a longitudinal quantitative research study with cross-over treatment on 30 foundations phase learners in a South African LSEN School. It was found that while wearing the weighted vests learner's in seat behaviour and attention-to-task improved.

The focus may need to be specifically on improving posture and balance by providing proprioceptive and vestibular input.

The inclusion of exercise within the classroom routine can also provide additional proprioceptive and vestibular input to assist with regulation of arousal levels and focus.[52] Kimball[53] discusses how heavy work activities and an increase in motor activity in the classroom can improve focus. Bundy et al[19] recommends that learners help out with chores in the classroom, such as banging erasers, carrying books or cleaning the black board. Cook[52] describes similar exercises and other modifications for learners with ADHD relating to an improvement in academic performance. These include; sitting on a wedge cushion, fidgeting with Theraband, taking frequent breaks, being a messenger for the teacher and playing certain games on the playground.[52] These findings were supported by Gronlund, Renck, and Weibull[54] who indicate that movement resulted in a improved attention span, social behaviour and motor skills such as dexterity.

Sensory modifications in the classroom have been shown to result in decreased disruptive behaviour and increased task engagement with resultant improved academic performance in the areas of reading and writing.[55]

Sensory integration modifications are additionally used for learners that display sensory integration practic dysfunction affecting a learner's motor planning.[19] Physical modifications can be used such as providing pencil grips, tilting the table, tracing, using grid paper or raised paper, or using a variety of scissors, as discussed in above under physical modifications.[19] Similarly these learners may benefit from the variety of sensory experiences described above, depending on their individual needs. In Mulligan's[2] study the importance of using multi-sensory media was emphasised with the need to modify the curriculum and its presentation to compliment all the above mentioned modifications.

2.5.4 **Modifications to the curriculum**

Modifications to the curriculum should be made in order to enhance the learner's interest and attention to the academic task.[2] In South African LSEN schools are expected to follow the national curriculum in order to reach the consistent learning outcomes prescribed by the Department of Basic Education.[16] Variations in the assessment processes are however allowed in order to accommodate for the variety of learning needs of the learners.[16] The Education White Paper 6[1] deems it essential for the education system to change to accommodate for the variety of learning needs, paying direct attention to curricular transformation. Educators are therefore encouraged to appeal to the interests of the learners in the class and maximise the learner's attention to task by presenting relevant and meaningful content that the learner can relate to.[33]

In order to increase a learner's interest modifications to the curriculum can be made by adding colour, changing text, incorporating new and novel work, breaking assignments into smaller steps or selecting topics of specific interest to the learners.[2] Bundy et al[19] describes how assignments can be broken into parts or shortened in cases where learners struggle to get through a large quantity of work. It may be beneficial for the educator to establish how much the learner needs to complete correctly in order to demonstrate he/she grasping the concept, thereby only requiring the learner to complete a potion of work.[19]

In review of the literature certain recommendations were made as to how academic work can be modified in terms of using colour and different textures.[8] Zental[56] warns against

highlighting irrelevant information with colour and changing letter size as it can interfere with class performance. Carbone therefore suggests using large font, italics, bold lettering and highlighting only to emphasise important aspects of the task when creating worksheets.[34]

By increasing creativity in the class activity the interest of learners can be captivated, making the presence of any other potential distracters less.[34] Novelty can be increased by including games, educational videos and role-play, in turn improving the learners attention to task.[34] Making modifications to how the curriculum is delivered also facilitates a learner's interests in the curriculum.

2.5.5 **Modifications to the delivery of the curriculum**

The delivery of the curriculum includes the teaching style, the ways in which things are presented to the leaner as well as the classroom organisation and structure.[2] The need for transforming the way in which lessons are instructed in order to accommodate for the variety of learning needs in the classroom is emphasised by the Education White Paper 6[1]. While there has been little support for educators in mainstream schools in this regard, specially trained educators at LSEN schools are better prepared to implement these types of modifications.[57]

Learners benefit from a structured environment and therefore educators need to create a well ordered and predictable classroom environment.[33] A visual cue of the daily schedule can be implemented in the classroom in order to facilitate routine.[8, 33] Educators can also assist with transitions in the classroom, making the transitions more fluid and predictable by allowing the learner time to prepare for the next activity.[33, 58] Carbone[34] suggests the use of a clock or timing device to increase the awareness of the time remaining as well as encouraging action to take place, assisting learners with regulating work pace.

Taylor and Larson[59] describe the use of multi-sensory tools, frequent changing between activities and giving learners a choice within the predetermined context. Similarly, Gardill and DuPaul[8] recommend the inclusion of active tasks interspersed between passive tasks in order to make use of excess energy. It is important to vary the presentation of the curriculum as well as include time to reinforce concepts.[8] Additional literature discusses the inclusion of games or gross motor activities when learning new or enforcing old concepts, to enhance motivation of the learners.[56, 60]

The delivery of the curriculum by the educator can also be modified in terms of the teaching pace, use of signals or cues, use of eye contact and teacher proximity to the learners.[8] The importance of giving regular and immediate feedback when the learners are completing tasks, rather than once finishing the task was identified as being important.[8, 33-34] Learners require frequent, concise and clear instructions as well as frequent educator contact time, verbal cueing and encouragement.[33, 58]

2.6 **Conclusion**

Learners with LDs experience a variety of barriers to learning limiting their successful participation in their learning environment. These barriers to learning can be reduced through successful collaboration of the occupational therapist and educator in modifying the learners' classroom environment in order to meet the specific needs of each learner. According to literature numerous strategies for modifying the classroom environment for learners with ADHD and other LDs exist. These modifications can be classified into behavioural modifications, physical modifications, sensory modifications, curriculum modifications and modifications to the delivery of the curriculum which have been discussed extensively in the literature review. A large focus is placed on modifying the environmental components according to the PEO model and OTPF II in order to enhance the learner's occupational performance by limiting the barriers to learning. There is currently no research available that identifies what EMs are used as well as the effectiveness of such EMs in classrooms for learners with LDs in the greater Johannesburg region.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter discusses the descriptive investigative qualitative research design that was used in order to carry out the semi structured interviews with grade two educators in LSEN schools. A description of the inclusion and exclusion criteria of both the schools as well as the educators participating in the study is provided. A variety of instruments were used in order to collect the data for the study, where ethical considerations as well as trustworthiness and rigor were taken into consideration. The data obtained from the study was analysed and categorised through the use of prior codes.

3.2 Research design

This study makes use of a descriptive investigative qualitative research design[(61)] which aims to explore the EMs that are used by educators in grade two classrooms of learners with LDs attending LSEN schools in Gauteng. A qualitative study is imperative as the objective of the study was to investigate multiple perspectives of insiders opinions, in their language, of the EMs they use every day and compare this to the outsiders view.[(62)]

Qualitative research studies require active participation by the participants so that a holistic and realistic perception of each participant's experiences can be obtained.[(63)] The researcher made use of the existing concepts and knowledge identified in the literature as well as deductive and inductive processes, to analyse information provided by the educators and through observation of the environment.[(62)] This allowed the researcher to get a descriptive understanding of the EMs that exist in the classrooms of LSEN schools as well as the educators perceived effectiveness of these modifications, thereby capturing the dynamics of the environment.[(62)] The researcher was able to conduct the study in the natural setting of the classroom, allowing the researcher to observe and confirm the use of EMs in the natural setting.[(63)]

A semi structured interview, based on pre-existing knowledge in the literature, formed the basis of the data collection.[(62)] The interview aimed to obtain rich data in terms of the participants understanding of the EMs used in the classroom. The semi structured interview is a direct approach that has prepared structured topics, but allows for promoting and deviation

to other relevant topics at the interviewer's discretion in order to obtain relevant data. The questions are open-ended allowing for in depth responses by the participants.

3.3 Study population

The study population refers to grade two educators currently working at LSEN schools for learners with LDs in the greater Johannesburg area. One specific grade was selected in order to ensure uniformity of the study sample, in terms of the curricular and expectations within the academic year. Grade two learners have consolidated basic reading and writing skills and are well adjusted to the school routine but still require a large amount of foundation intervention, and were therefore selected for the study.

3.4 Study sample

3.4.1 Schools

Purposive sampling was used in order to select the schools appropriate for the study. The LSEN schools were located via the Gauteng Basic Education Department, the Independent Schools Association of South Africa or by word of mouth. The schools were required to meet the following inclusion criteria.

Inclusion criteria:

- The school had to be a LSEN school for learners with LDs.
- The school had to follow a mainstream syllabus.
- Occupational therapists had to be working in the school in collaboration with the educator in the classroom.
- Educators had to be conversant in English.

Exclusion criteria:

- Schools that are not for LSEN.
- Schools for learners with physical disabilities.
- Schools for learners not following a mainstream syllabus.

- Schools where occupational therapists do not work in collaboration with the educators in the classroom environment.

- Educators that are not conversant in English.

Sample size

Once identifying the LSEN schools in Gauteng, only those schools located within the greater Johannesburg area were contacted for convenience. This included all LSEN schools for learners with learning disabilities. Sixteen LSEN schools catering for learners with LDs were identified within the greater Johannesburg area. This allowed for a heterogeneous sample, including both government and independent schools, which allowed for an overview of the situation and perceptions across a number of different contexts. The location of the schools ranged between upper and middle class areas, where the feeder areas of the schools ranged from low socio-economic areas to high socio-economic areas.

Principals at the schools were contacted telephonically to ensure that the schools met the inclusion criteria. Four of the schools did not meet the inclusion criteria of the study and were therefore excluded from the study. Of the LSEN schools that met the inclusion criteria, principals at 12 schools were contacted via email. Permission for their school's inclusion in the research as well as permission to approach educators at their school to participate in the study was requested. One school declined participation in the study.

3.4.2 Educators

The demographic questionnaires were emailed to the 11 schools which principals gave permission for participation in the study. These were completed by all the grade two educators employed at the school and these questionnaires were reviewed to purposively select the educators to be approached to participate in the study. One educator from each of the 11 different schools was selected to participate in the study provided they met the following inclusion and exclusion criteria.

Inclusion criteria:

- Educators currently employed and working at the LSEN school for learners with LDs.

- Educators currently working and have been working as the grade two class educator for the full school calendar year.
- Educators who had completed post basic courses or qualifications in special education teaching.

Exclusion criteria:

- Educators working at LSEN schools for needs other than LDs.
- Educators who have not been working with the same class for the full school calendar year.
- Educators who do not have a basic course or qualification in special education teaching.

From the demographic questionnaires the most experienced grade two educator from each school was selected, relating to the years of teaching experience in an LSEN grade two class, provided they met the inclusion criteria. Should there have been more than one educator that met the inclusion criteria from the same school that had been working in a grade two class for more than ten years, which is the number of years according to Schell and Schell[2] it takes for expertise to develop, the educator invited to participate in the study was selected randomly. Those educators selected in this manner were then invited to participate in the study.

Sample size

None of the educators selected to participate declined to participate in the study. After educators at nine schools were interviewed, it was felt that data saturation had been achieved, and further interviews were therefore not conducted. One of the educators that participated in the study was excluded from data analysis on review of additional information provided in the interview as she did not satisfy all the inclusion criteria for the study.

3.5 Research procedure

3.5.1 Ethical considerations

A protocol and application for research with human subjects was submitted to the Ethics Human Research Committee at the University of the Witwatersrand. An ethical clearance certificate was obtained (reference number M10916) (Appendix A).

After gaining ethical clearance the following ethical procedures and considerations were conducted. Permission from the Gauteng Department of Basic Education was obtained (reference number D2011/54) (Appendix B) prior to assuming data collection. A permission letter (Appendix C) was provided to each of the principals of the selected schools. Permission to participate in the study was then obtained from each of the principals of the schools at which educators would be participating in the study as well as permission for photographs to be taken of the classrooms and tangible EMs (Appendix D).

Prior to data collection the study was explained in detail to each of the selected educators by means of an information sheet (Appendix E), and they were invited to participate in the study. Once accepting participation in the study each participant signed the informed consent form to be interviewed (Appendix F). They were also asked to give signed permission to be audio taped (Appendix F).

Confidentiality was ensured as subjects' identities and schools names were known only to the researcher. No identifying data was used during data analysis. When the transcriptions were performed for the interviews the names of participants were replaced with codes. Findings were reported in such a way that no individual will be identifiable. In face-to-face interviews anonymity cannot be guaranteed, only confidentiality and therefore participants will not be traceable.[(64)] All recordings and data will be stored safely for six years according to HPCSA regulations. Participants were informed that they were free to withdraw at any time from the study and feedback would be given on request.

3.5.2 Instruments

The following instruments were used for data collection:

3.5.2.1 A demographic questionnaire

A demographic questionnaire (Appendix G) was used to record demographic information of both the educator and the profile of the learners in the class. This questionnaire was initially compiled by the researcher, and reviewed and modified by the supervisor and researcher.

This was deemed important to gain an understanding of the participants' background and context from which the qualitative data was gathered. In order to profile the participants, each participant was asked to record their gender and age. Together with this it was important that each participant met the inclusion criteria of the study and it was therefore important to establish each participant's teaching qualifications and additional specialised courses. Each participant was also required to record their years of teaching, years teaching at an LSEN school, years teaching grade two as well as their years at their current school. This information was used to ensure each participant matched the inclusion criteria of the study as well as to select the most qualified teacher at each school.

The profile of the learners in each educator's class was also established in order to get a greater understanding of the classroom environment and profile of the learners' needs. The profile of the class was established by the number of learners in each class, the gender ratio, age ranges, as well as types of learning difficulties requiring classroom modifications. Examples of learning difficulties were provided, through review of the literature, including concentration difficulties, overly active, behavioural difficulties, motor difficulties, sensory difficulties or specific reading and writing disabilities). It was also important to identify that there were no physically disabled learners in the class as this is an exclusion criteria for participation in the study.

3.5.2.2 Questions for key informant interviews

A key informant, semi-structured interview, allowing moderate control of the researcher over the discussion and sequence of the research questions was used. An interview guideline (Appendix H) was used in order to facilitate the interview. This was initially compiled by the researcher and based on Mulligan's[(2)] framework for EMs as well as the OTPF II which

identifies which environmental and contextual aspects each of Mulligan's[2] modifications relate to.[4]

The following interview topics were included based on the reviewed literature:

- Behavioural modifications (Social & cultural)
- Physical modifications (Physical)
- Sensory modifications (Physical & temporal)
- Curricular modifications (Virtual & temporal)
- Modifications to the delivery of the curriculum (Social & temporal)

The interview guideline was reviewed and modified together with the supervisor, in order to create the most effective interview questions, while maintaining ethical considerations and rapport with the participant. The guideline consisted of an introductory section, five interview topics and a conclusion. It consisted of open-ended questions to elicit maximum responses from participants.[62]

The introductory section welcomed the participant, introduced the participant to the researcher and the research topic as well as allowed the participant time to review the information sheet and sign the informed consent. The participant's understanding of EMs was clarified, in order to ensure that both the researcher and participant had the same understanding of what is meant by EMs. The participant was introduced to the five interview topics and it was explained to them what questions would be asked under each of the five topics, i.e. what current modifications are in place in the classroom specific to each topic, have these modifications been effective, have other modifications been used previously and why are these no longer used, and are the appropriate resources available for you to carry out the specific EMs.

Prompts, in the form of gentle probe follow up questions, assisted the researcher to delve deeper into the areas the participant may not have commented on.[62] In the conclusion the participant was asked whether there were any factors that limit the use of EMs and whether there was anything else they wanted to add. The participant was thanked for their

participation and the interview was concluded. All key informant interviews were recorded with the participant's consent and were transcribed verbatim for data analysis.

3.5.2.3 Photographs

The researcher photographed the general layout of the classroom as well as any tangible EMs that were discussed in the interview e.g. specialised seating and pencil grips. (Figure 2-figure 32)

3.5.2.4 Field notes

Field notes were recorded after each interview was conducted and formed part of an audit trail (Appendix I). The researcher as a participant observer was able to establish and maintain a relationship within the natural setting while observing and recording the experience.[63] These field notes formed part of the audit trail that the researcher completed throughout the period of the research.

3.5.3 Data collection

The data collection was conducted at each of the schools on dates suiting the educators and the researcher. Face-to-face semi-structured interviews lasting approximately 45 minutes were conducted by the researcher. The participant's perception of the researcher and her rapport with them can affect the quality of the interaction between participant and researcher.[65] The researcher should form a partnership with the participants so they work together to explore ideas. By listening to participants carefully the researcher can interpret and respond to what the participants are reporting.[66] This manner of engaging with the participant is a key research instrument that influences how information is elicited and expressed.[66] The researcher established a relationship of trust and rapport with the participants by explaining the purpose, objectives and procedures of the study, as well the participants' rights. The participants also needed to feel at ease so the interview took place in the educator's classroom, which is a familiar setting to the participant. This also allowed the researcher to observe access to the resources in the classroom and to take photographs with the schools and participants' permission.

Each participant was interviewed according to the interview guidelines. The interviews were recorded for further data analysis. Photographs of the classroom environment and tangible EMs were taken. The subjects were thanked for their participation, and asked whether they

would like to receive the results of the study at a later stage. If so, contact details were taken, otherwise they were instructed that they could contact the Wits Occupational Therapy Department for information at a later stage. This procedure was followed at each of the schools selected as part of the study sample.

3.6 Trustworthiness and rigor

3.6.1 Triangulation of data from multiple sources

The researcher made use of triangulation of data, using multiple methods of data collection in order to support the research findings. The methods included the transcribed interviews, which were the main source of data; photographs, to confirm information about the tangible EMs reported in the interview; as well as an audit trail. The audit trail recorded the perceptions of the researcher regarding the interviews and school environments.

3.6.2 An audit trail

An audit trail (Appendix I), by means of a researcher's journal, was kept throughout the data collection phase recording any additional information collected by the researcher. This included the development of the research process, field notes and additional thoughts or ideas while processing the data. This ensured that a rigorous record of the data gathering process and the data analysis was recorded, allowing additional information that could be scrutinized to confirm, further validate and strengthen the findings.

3.6.3 Data saturation

Data saturation was achieved after eight interviews were performed. The content of the interviews no longer described new or novel EMs, instead the participants were repeating the same EMs that were used in the classroom.

3.6.4 Code checking

To increase the reliability or trustworthiness of the analysis process, the researcher worked to code the data independently. The supervisor also coded a section of the transcripts independently before comparing and discussing it with the researcher. They then together refined and agreed on the codes and categories.[67]

3.6.5 Rich thick data

The experiences of the participants allowed for rich thick data to be presented in the findings. The use of participants' direct opinions as well as photographs of the classrooms conveys a clear indication of the study setting and experiences of the participants.

3.6.6 Clarify researcher bias

According to Creswell[63], who the researcher is becomes inseparable from the research. It is therefore important to reflect on the background of the researcher for bracketing and self-reflection in order to not take a bias view of the findings. Reflexivity refers to the 'researchers critical self-awareness' and is a vital process in which the researcher questions and observes themselves at the same time as they listen to and observe the participants.[68]

The researcher began formulating the study while employed at a government LSEN school, during her first year of employment post community service. The need for the study was identified when the researcher perceived a lack of implementation of EMs by occupational therapists into the classrooms of the LSEN school at which she was employed. With further questioning and investigation of surrounding schools it was noted that a variety of EMs were used in the LSEN schools across Johannesburg. In order to gain a greater understanding of what EMs are used in LSEN schools across the greater Johannesburg region, it was decided that a research study would be performed.

Over the time that the protocol was drawn up and the research commenced the researcher had relocated to another government LSEN school due to personal reasons. Since commencing the data collection the researcher accepted a locum position at a private LSEN school for a period of four months and is now employed at a private practice catering for learners with sensory integration and learning difficulties. The researcher reflected on her own view of EMs from her experience in working in LSEN schools and what biases she might hold in terms of their implementation and effectiveness in the classroom and remained aware of these biases during the interviews so as not to influence the participants if possible in any way.

The variety of employment settings the researcher experienced had a positive influence on the content of the study, due to the researcher being fully integrated in the field of the study and therefore being able to identify with the data. The variety of employment settings,

including both government and independent schools, as well as the researchers experience allowed her to be more aware of any bias she may have had.

Due to the small volume of LSEN schools that met the inclusion of the study, the schools that the researcher worked at were included in the study. However the educators that were interviewed did not have any personal relationship with the researcher and the researcher had never worked together with any of these educators, classes or learners that formed part of the study. Confidentiality was maintained throughout all interactions with the schools and the educators.

3.7 **Data analysis**

The demographic information was tabulated in order to clearly establish an understanding of the study samples background and present context.

The individual interviews were recorded and transcribed verbatim. The researcher made reflective notes while reading the transcripts, which formed part of the audit trail (Appendix I).[63] The process of using a priori approach to produce categories and an inductive approach to determine codes (e.g., Martin, Marsh, Williamson and Debus[67], 2003) led to theoretically and practically relevant results. Transcripts were reviewed to identify the codes by analysing the content of the interviews. Initially codes were assigned according to the theoretical framework previously defined into five priori (or theoretical) categories identified from previous research by Mulligan[2] as well as the environmental contexts identified in the OTPF II[4]. The categories considered the modification of the social, cultural, physical, temporal and virtual environments of the classroom. The initial codes were combined into descriptive sub-categories and further refined through review of reflective notes and discussion, into the five priori categories through a process of sequential analysis.[69]

First consensus about themes and categories was reached by the researcher and the supervisor. Thereafter, through an inductive process and by reading and re-reading the interviews, categories were modified in order to better reflect the data.

3.8 **Conclusion**

Through the triangulation of data from transcribed interviews, photographs and the audit trail, rich thick data was collected by the researcher. Through thorough data analysis and code checking clear categories, sub categories and codes were identified by the use of a priori

approach. Thus allowing the findings to be adequately analysed and discussed, describing the use of EMs in grade two classrooms for learners with LDs.

CHAPTER 4: FINDINGS

4.1 Introduction

This chapter will discuss the demographics of the participants and the learners in their classes as well as the research findings obtained from the interviews of eight educators who participated in the study.

4.2 Description of the schools

All schools were located within the greater Johannesburg region. Eight educators at the schools participated in the study. All eight schools were classified as LSEN schools for learners with LDs that followed a mainstream syllabus. The eight schools had occupational therapists based at the school, providing school based intervention in collaboration with the educator. The educators interviewed at each of the eight schools were conversant in English. All eight schools participating in the study therefore met the inclusion criteria of the study. Of the eight schools participating in the study, four of the schools fall under the Gauteng Department of Basic Education and the other four schools fall under the Independent Schools Association of South Africa.

4.3 Demographics of participants

There were eight participants that participated in the study. All participants met the inclusion criteria of the study. Table 4.1 represents the demographic information of all the participants in the study. The years of experience teaching in grade two and LSEN School's varied greatly between the participants. All participants had been teaching the same class since the beginning of the calendar year. The sample was more homogeneous in terms of the age of the participants, with only one participant being younger and relatively recently qualified. All participants met the inclusion criteria for having completed a course in remedial teaching but 22.2% did not have a qualification in remedial teaching.

Table 4.1: Demographic information of participants

Participant	Gender	Age	Remedial Qualification	Remedial courses	Years Teaching	Years in LSEN school	Years teaching Grade 2	Years at current school
001	Female	52	Yes	Yes	25	12	12	6
002	Female	57	Yes	Yes	30	6	5	2
003	Female	63	No	Yes	41	11	30	11
004	Female	67	Yes	Yes	40	22	12	22
005	Female	49	Yes	Yes	27	4	10	4
006	Female	25	No	Yes	4	4	1	4
007	Female	59	Yes	Yes	28	24	24	20
008	Female	57	Yes	Yes	15	10	9	5
Mean (SD)		53.62 (12.88)			26.25 (12.23)	11.62 (7.67)	12.87 (0.59)	9.25 (7.72)

Table 4.2 demonstrates a comparison between the demographics of participants working at government and independent schools. During the data collection differences were recorded in the audit trail between government and independent schools. A comparison between the demographics of these two types of schools was therefore thought to be beneficial as trends were noted between the two types of schools. The participants working in the government schools were slightly younger than the participants working at the independent schools, although one participant in the study sample was significantly younger than the rest of the sample and was working at a government school. Of the participants interviewed in the government schools, only 50% of the teachers had a remedial qualification, where 100% of the participants in the independent schools had a remedial qualification. No significant comparisons are noted between government and independent schools relating to general teaching experience or teaching experience in an LSEN school.

Table 4.2: Comparison between the demographics of participants working at government and independent schools

	Females	Average age	Remedial Trained	Remedial courses	Average years teaching	Average years teaching in LSEN schools
Department of Basic Education	100%	49 years	50%	100%	25 years	11 years
Independent Schools Association of South Africa	100%	58 years	100%	100%	27.5 years	12.5 years

4.3.1 Profile of participants' classes

When considering the profile of the class, as indicated in Table 4.3.1, the mean number of learners in each class was approximately 13, with the range being from 8-16. According to the demographic information of the learners it was clear that the majority of the learners were male.

Table 4.3.1: Profile of participants' classes

Participant	Number of learners	Number of males	Number of females
001	14	13	1
002	12	8	4
003	16	13	3
004	8	5	3
005	14	9	5
006	14	10	4
007	14	9	5
008	13	10	3
Mean (SD)	13.12 (2.35)	9.62 (2.61)	3.5 (1.30)

Table 4.3.2 compares the mean number of learners in the participants' classes between government and independent schools. Government schools are noted to have on average a higher number of learners in the class.

Table 4.3.2: The mean number of learners in the classes of government and independent schools.

	Mean number of learners in each class
Department of Basic Education	14.5
Independent Schools Association of South Africa	11.75

Table 4.3.3 indicates the profile of the learning disabilities in each of the participants' classes. All of the participants reported learners in their class presenting with attention difficulties, over activity and specific reading difficulties. While the majority of participants also dealt with learners with behavioural and motor and sensory problems only 44.4% of the participants had learners identified as being on the autistic spectrum in their classes.

Table 4.3.3: Profile of the learning disabilities in each participants' classes

Participant	Difficulties in classroom							
	Attention	Over active	Behavioural difficulties	Motor and/or sensory difficulties	Specific reading difficulty	Specific writing disability	Learners on the autistic spectrum	Other
001	Yes	Yes	Yes	Yes	Yes	No	Yes	Semantic pragmatic
002	Yes	Yes	Yes	No	Yes	Yes	No	
003	Yes	Yes	Yes	Yes	Yes	Yes	No	
004	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
005	Yes	Yes	Yes	Yes	Yes	Yes	No	Emotional and social difficulties
006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tourette syndrome
007	Yes	Yes	Yes	Yes	Yes	Yes	No	
008	Yes	Yes	No	Yes	Yes	Yes	Yes	Receptive-expressive language difficulties

4.4 **Environmental modifications**

The participants shared their experiences of using EMs in the classrooms of grade two learners in LSEN schools. The theme of the study was based on Mulligan's[(2)] theoretical framework of EMs in the classroom. The five prior categories identified were based on Mulligan's[(2)] predefined categories, clustering the opinions of the participants into behavioural modifications, physical modifications, sensory modifications, curriculum modifications and modifications to the delivery of the curriculum. A further category was defined which describes the participants perceived limitations affecting the implementation of EMs. The theme, categories, sub categories and codes can be viewed in Table 4.4. The categories used were coded and the following summary of links between the data was found.

Behavioural modifications reflected various ways that the participants dealt with undesirable behaviours in the classroom, specifically by knowing the learners difficulties, identifying ways to handle the undesirable behaviour and being aware of the influence learners had on their peers. Physical modifications dealt with the structure and layout of the classroom as a whole as well as the specific furniture and objects specific to individual learners. Sensory modifications included ways in which spaces were created in the classroom as well as specialised programmes and equipment was used to assist learners with sensory processing difficulties. Curriculum modifications required fitting the national curriculum to the needs of learners and making learning interesting to maintain attention in class. The modifications to the delivery of the curriculum involved the way in which the participants organised their class and presented the curriculum.

Limitations that participants felt affected the implementation of EMs in their classrooms include the classrooms themselves which were sometimes too small, the time they had to work through the curriculum as well as their own work load and lack of skill.

Table 4.4 Theme, categories, sub categories and codes

Theme	Categories	Sub-Categories	Codes
Environmental Modifications Mulligan(2001)	Behavioural Modifications	Knowing the underlying problem	• Understand each learner • Tolerate specific behaviours
		Handling	• Setting rules and creating boundaries • Use yourself • Reflect on their behaviour • Reinforcements
		Influence of peers	• Social position of the learners • Location of the learners in the classroom
	Physical Modifications	Structuring the classroom	• Furniture and classroom layout • Classroom appearance
		Structuring and accommodating individual learners	• Placing learners • Furniture • Writing aids • Assistive devices
	Sensory Modifications	Changing the space	• Creating space
		Providing strategies	• Specialised programmes • Specialised equipment
	Curriculum Modifications	Fitting the curriculum to the learners	• National curriculum • Adapting to the needs of the learner • Make learning interesting
	Modifications to the delivery of the curriculum	Organising the class	• Routine and structure • Transitions
		Getting it across	• On the right level • Extra help
	Limitations affecting implementation of EMs	Classroom	• Resources • Number of learners • Small classroom sizes

		Curriculum	• Time • Large curriculum
		Participants	• Lack of skills • Other responsibilities

The themes, categories, subcategories and relating codes are presented below. A detailed description of the findings will be presented, including direct quotes from the participants, inserts from the audit trail as well as photographs of the environmental modifications observed in the classrooms. The participants have been assigned numbers to ensure anonymity.

4.4.1 Behavioural modifications

Behavioural modifications are used to control disruptive behaviours and teach appropriate behaviours.(2) The participants described the importance of knowing the underlying problem of the learner in order to manage learners' behaviours in terms of setting boundaries, reflecting on the learners' behaviours, as well as how they use themselves. Selective placement of learners in relation to each other or the classroom as a whole was also described as having an influence on learners' behaviours.

4.4.1.1 Knowing the underlying problem

The participants expressed that it was important to establish the underlying problem for each individual learner when trying to modify a learner's behaviour. By trying to **understand each learner** the participant could get a greater idea of the learner's problems as they all differed.

- *"[…], each child is different."* (004)

Most participants felt that in order to set effective boundaries for behaviour and assist the learner in dealing with it, it was important to understand the reasons for or cause of the behaviour.

- *"[…], what are they doing, why are they doing it, and therefore what can you do to aid it now? What is causing it?"* (002)
- *"Have a deep understanding of why a child is actually doing that or acting in that manner."* (001)

If the cause of the behaviour is understood this allowed participants to **tolerate specific behaviours**, particularly when the behaviours are not intentional and rather related specifically to their learning disability.

- *"If it's a case of them being impulsive… then I would just turn a blind eye, because it's not their fault and you would rather encourage the positive."* (006)

Tolerance of poor behaviour also incorporated allowances for aspects that participants felt a specific learner could not cope with even though they knew it was unacceptable. However the control of behaviour of each learner was an individual concern.

- *"First of all you have to let them know that it is not acceptable, but if they can't cope with that, then it is a case of you might tolerate it."* (002)
- *"[…], accommodate each individual whatever his difficulty is."* (008)

According to the audit trail the independent schools demonstrated greater insight into understanding each learners needs and tolerating behaviours relating to their difficulties than the government schools.

4.4.1.2 Handling

Participants described different methods of handling the learners in order to direct desired behaviours. **Setting rules and creating boundaries** is considered to be effective as the learners then know what is expected of them, and therefore adjust their behaviour accordingly. Figure 4.1 demonstrates the implementation of rules in the classroom that are visible to the learners.

- *"[…], setting the ground rules, so that they know the boundaries and their expectations… I am quite firm with boundaries, but within those boundaries, then they can hopefully relax and enjoy the experience."* (002)
- *"I have to be disciplined and you must really be strict to put them in their boundaries."* (003)
- *"They need structure and boundaries."* (001)

Figure 4.1 Rules in classrooms

One participant reported on the importance of being consistent in the classroom when enforcing rules and boundaries.

- *"I try to be consistent."*(002)

According to the audit trail the need for consistency was not reported by all participants. Inconsistencies in rule setting and boundaries were at times noted.

The participants report handling is not only how you handle the learners but how you **use yourself** when interacting with them. Keeping calm and using a mediation-reflective approach were found to be effective for certain teachers.

- *"I do try to keep it calm because I think that helps the children. If you are volatile then they are."* (004)
- *"[…], to use more of a mediation, reflective approach, as opposed to… this is your punishment."* (001)

The educator-learner relationship can impact on the learners' behaviour and academic performance.

- *"[…], it influences their work and their behaviour."* (006)
- *"I do like giving them reasons behind it."* (007)

Some of the participants reported that giving the learners a chance to **reflect on their behaviour** positively influenced their behaviour.

- *"[…], they have got to learn to monitor themselves."* (008)
- *"They have to listen to each other."* (002)

In one specific school a behaviour modification programme, known as the Cognitive Enrichment Approach was reported as being effective in modifying learners' behaviour. Figure 4.2 demonstrates posters that are used in the classroom and assembly that relate to this programme.

- *"[…], a more meditative kind of… reflective… facilitated modelling… them reflecting their own behaviour."* (001)

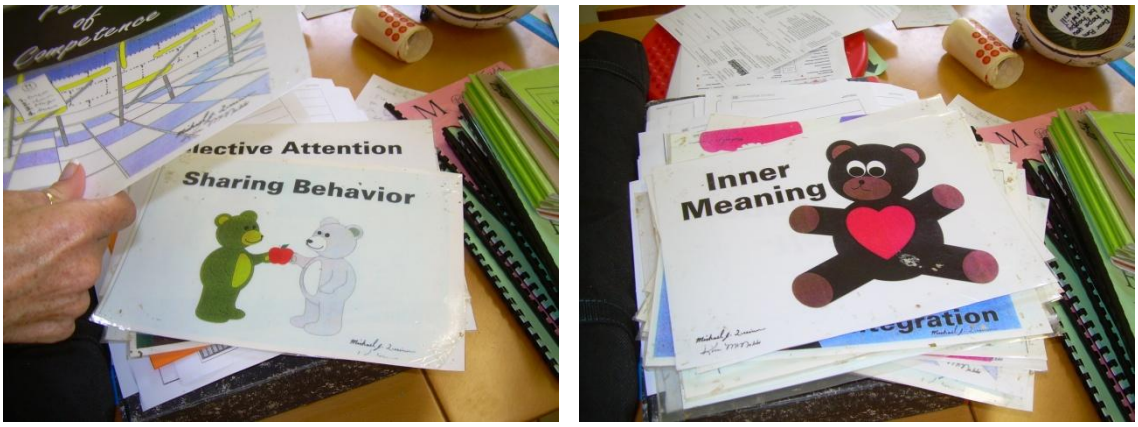

Figure 4.2 Posters used for the Cognitive Enrichment Approach

According to the audit trail participant 001 enthusiastically discussed the Cognitive Enrichment Approach, using descriptive examples and demonstrating dynamic implementation of the programme.

Some participants provided the learners with a time out opportunity in order for them to effectively reflect on their own behaviour. In one specific school the learners were encouraged to go into the quiet garden to reflect, as seen in Figure 4.3.

- *"If it's a specifically bad day then it's time out, so that they can find their own space."* (007)

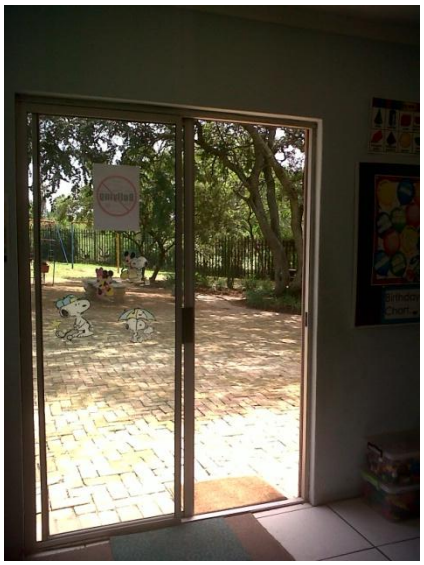

Figure 4.3 Time out in the garden is used for self-reflection

The use of **reinforcements** was a common modification in order to facilitate desired behaviour or to limit disruptive behaviour. Some participants reported the effectiveness of using negative reinforcements for undesirable classroom behaviour.

- *"If they misbehave in class they will get writing out… they must remember what they did wrong."* (007)
- *"They have to line up or write out."* (003)
- *"You can use that (demerit) as a threat, a carrot…"* (004)

Positive reinforcements were commonly used by the participants, and were reported by most participants as being effective.

- *"Some children just lap up praise…One of the big things is to start developing their self esteem and independence in the society of the classroom."* (002)
- *"Something (star chart) that is visual or tactile is far more rewarding for this age group."* (008)
- *"It's something they can work towards… that kind of inspires them."* (006)

The effectiveness of reinforcements was however debated by the participants.

- *"There is no point, it (negative reinforcement) doesn't work. It always has to be positive."* (002)
- *"[…], for some that works and for some that doesn't …the naughty disruptive ones, they just don't care."* (006)
- *"Apparently it's for the sweet and nothing else."* (007)
- *"School work should not be a competition."* (005)

Reinforcement strategies, in the form of sticker charts, merits and demerits were observed in the classroom, as seen in the Figure 4.4.

Figure 4.4 Sticker charts, merits and demerits in the classrooms

According to the audit trail most government schools used both positive and negative reinforcements, where independent schools focused on positive reinforcement in order to

influence learners' behaviours. The effectiveness of handling behaviours was recorded as being dependent on the educators themselves, the consistency of their interactions as well as the way in which the educators handled behaviours.

4.4.1.3 Influence of peers

Participants reported that by adjusting learners' proximity to each other as well as their general placement in the classroom, their behaviour could be better managed due to the influence of peers on each other. The **social position of the learners** in respect to other learners was reported to affect the learners' behaviours. Participants therefore modify the position of learners in respect to each other in order to facilitate desirable behaviours.

- *"You have those two separately because you know they are going to chat."* (002)
- *"I will make sure they (an uninvolved learner) are included, by putting them in a central point… A needy learner I will pair up with a quiet introvert."* (005)
- *"[…], disruptive learners you try and separate them as best you can."* (006)

The participants also identified specific **location of the learners in the classroom** impacting their ability to manage behaviours. By altering the placement of the learners in the classroom the participants report to optimising desired behaviours.

- *"[…], at the front I have got the ones that need to be a little bit more refocused, the little ones that ask lots of questions."* (008)
- *"If you have a child that always turns around put him at the back of the class…so if he tries to get somebody else's attention then at least the other child can make a choice whether to turn around or not."* (002)
- *"[…], they became even more disruptive in their own corner."* (004)
- *"Those that need an eye on them are closer to me."* (001)

One of the participants still reported challenges with managing learners' behaviours.

- *"I don't really know if you can really say I have solved it."* (006)
- *"I haven't quite figured that one yet… So not yet one that has worked for me."* (006)

4.4.2 Physical modifications

Physical modifications are beneficial to enhance performance of the learners by modifying the physical environment of the learners. This can be done by structuring the physical environment of the class or by adapting the learners work space or tools to accommodate for their barriers to learning.

According to the audit trail the physical modifications were the easiest EMs to discuss due to their tangible nature.

4.4.2.1 Structuring the classroom

The participants identified modifications to the physical structure of the classroom in order to enhance the teaching and learning environment. However the diverse learning needs of the learners results in a number of challenges.

- *"It's always best fit. It's never perfect for everybody."* (004)

The **furniture and classroom layout** were established as having an impact on the learning experience. A variety of desk arrangements were observed ranging from groups, lines, rows, and a combination of these, as seen in Figure 4.5.

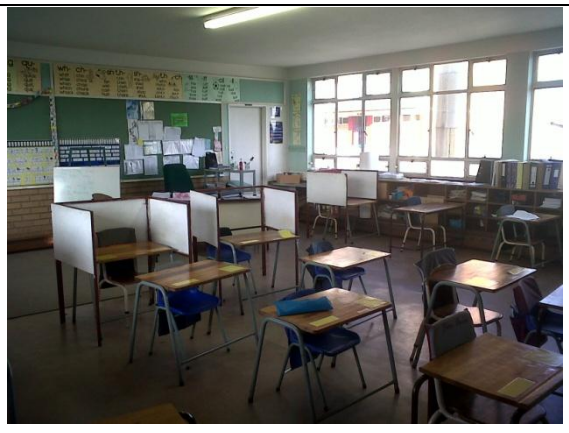

Figure 4.5 Desk arrangements

The perceived effectiveness of specific desk arrangements varied between the participants. According to the participants the desk arrangement was dependent on the tasks that the learners participate in.

- *"It depends on what the activity is… sometimes we have them in straight rows facing the board, other times we have them all the way around the outside so I have a space in the middle if we doing art."* (002)
- *"We still do a lot of black board work and you can't have them sitting sideways to the blackboard."* (004)

Other participants reported to arrange the desks according to the learners needs.

- *"Each row has a specific group, for example the first row is my middle to stronger group."* (006)
- *"I wanted tables that I could change the shape of when I wanted, how I wanted… in a group or individual… those that I can feel can work in a group, without kind of relying on each other are seated like this (points to a group formation)…Those that I feel need their own space more, so that they can work more independently, they will sit there (points to a line formation)."* (001)

The general **classroom appearance** in terms of colour and visual distractions was reported to impact the quality of the learning experience. Participants reported reducing visual distractions in terms of colours and posters.

- *"[…], try not to keep too much bright colour on the front."* (002)
- *"Keep it cool colours, less distracting"* (008)
- *"[…], sometimes a bit too busy, not too good. A bit distracting."* (001)

It was noted that some of the classes used lighter colours, or did not have as many visual distractions in the front of the class in terms of posters, as seen in Figure 4.6.

Figure 4.6 Limiting posters and colours at the front of the classroom

One participant reported to effectively reduce the distractions of the lockers by placing curtains over the lockers, as displayed in Figure 4.7.

- *"These are their lockers which now have curtains on…because not to distract them."* (007)

Figure 4.7 Covered lockers to reduce distractions

In one particular school, the windows were higher up on the side facing outside and no windows were on the opposite side of the class, as the classes were joined by a corridor, as depicted in Figure 4.8. This prevented learners from looking into the class from the outside, and prevented the learners inside the class from getting distracted by the outside environment.

- *"[…], the way the windows are, we don't really have distractions."* (005)

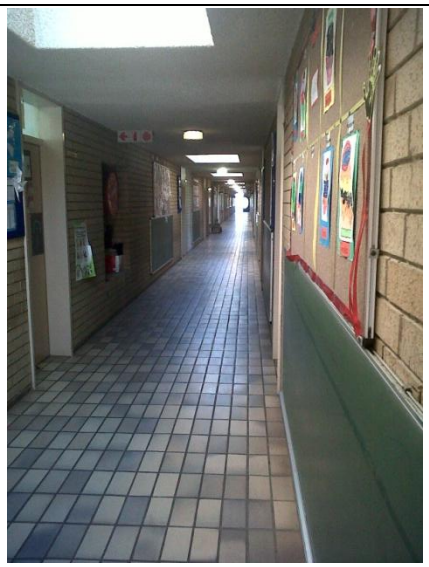

Figure 4.8 Limited external distractions

In one participant's classroom textured glass was noted on some of the classroom windows, also limiting distractions from the outside environment, as seen in Figure 4.9.

Figure 4.9 Textured glass in windows

Figure 4.10 demonstrates the use of curtains in the classroom to effectively limit distractions of the outside environment.

Figure 4.10 Curtains to limit external distractions

Two classrooms were noted to have fitted carpets to effectively limit the noise of the chairs on the floor in the classroom, as depicted in Figure 4.11.

Figure 4.11 Carpets in the classroom

One particular school had placed tennis balls on the feet of each chair in order to limit the auditory distractions when chairs are moved on the floor, as shown in Figure 4.12.

Figure 4.12 Tennis balls on the feet of chairs

4.4.2.2 Structuring and accommodating individual learners

It was reported by participants that the structuring of individual learners as well as accommodations made for individual learners allowed for greater in classroom performance of

learners. Participants report to **placing learners** in specific areas in the classroom according to their learning needs.

- *"If it's something like concentration…you try to reduce visual disturbances."* (002)
- *"[…], the ones that are quite active in the front so they can't really disturb those behind them."* (007)
- *"The kids with OT (occupational therapy) problems… I structure them so they are flat on the board. Those with visual perceptual difficulties or visual difficulties are flat on the board."* (001)

Two participants identified the use of a private cubicle for certain learners, as depicted in Figure 4.13. The effectiveness of the cubicles did however depend on the specific learner.

- *"If a child is very disruptive and distractive for other learners I will try to make him a private little office."* (005)

Figure 4.13 Private cubicle

It is essential that the **furniture** positively assists the learner, adequately contributing to a positive learning environment. Participants reported that it was important to size the desks and chairs specific to each learner, or make adaptations to the desk or chair should they not be suitable.

- *"I do try and get them chairs that are suitable for their height and a desk."* (007)

- *"[…], for some of them who are too short for their feet to reach."* (006)
- *"Especially if the child is short, we tip the desks, we put blocks under… it has the same effect as those (inclined) boards." (008)*

Figure 4.14 depicts foot rests that are used in one participant's classroom for learners whose feet do not touch the floor.

Figure 4.14 Footrests

Large desks, as shown in Figure 4.15, were provided in some schools to provide the learners with adequate space to organise their work.

- *"That's an adaptation to give them lots of space."* (004)
- *"This is a nice big desk for them… nothing is going to run off."* (005)

Figure 4.15 Large desks

One specific school had specialised chairs made for their learners which assisted with optimal seating posture at the desk, as seen in Figure 4.16.

- *"These chairs are specially designed for proper seating… the whole structure is designed so they would sit up properly. It's very hard to slouch in this and we don't have the rocking."* (001)

Figure 4.16 Specialised chairs

Some participants reported to using an inflated plastic cushion, material cushion, ball or wedge for the learner to sit on, as depicted in Figure 4.17, to assist with optimal sitting posture.

- *"Children that couldn't sit still they had a kind of cushion (disc-o-sit) they were sitting on."* (001)
- *"[…], that's (ball) good for them…because of the movement it sort of controls their focus."* (008)
- *"[…], they have wedges, yes, they need it."* (002)
- *"[…], just sort of stabilise them… that also worked very well."* (008)

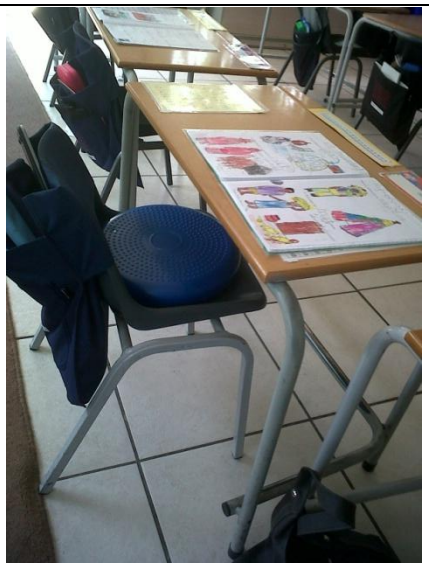

Figure 4.17 Disc-o-sit, ball and pillows for seating

Numerous **writing aids** were reportedly used in the classrooms, which improved the quality of individual learner's handwriting. Some learners made use of specific pencil grips.

- *"[…], pencil grips a lot of kids use, because they wrap around and don't hold properly."* (001)
- *"[…], the triangular grips."* (002)
- *"[…], they just love using it (pencil grip)."* (006)

Specialised pencils, such as triangular shaped pencils or clutch pencils were also reportedly effective for specific learners.

- *"Yes, we try to use these triangular pencils… It helps a lot."* (005)

- *"One thing I did use with one particular child, it worked brilliantly… a propelling pencil. If you press too hard the lead breaks."* (002)

An adaption of attaching an elastic band from the pencil to the wrist reportedly assisted a learner with holding the pencil correctly.

- *"They have the elastic (band) on the pencil."* (002)

Specialised books or lines were used to assist with handwriting difficulties. Some participants reported to modifying handwriting books for specific learners.

- *"[…], use books and lines that work for your child."* (002)
- *"[…], we use…the Irish lines."* (007)

One participant reported that her learners made use of large lined books with specially printed red lines to prompt the positioning of words on the line, as seen in Figure 4.18.

- *"We have these especially printed with the red lines."* (004)

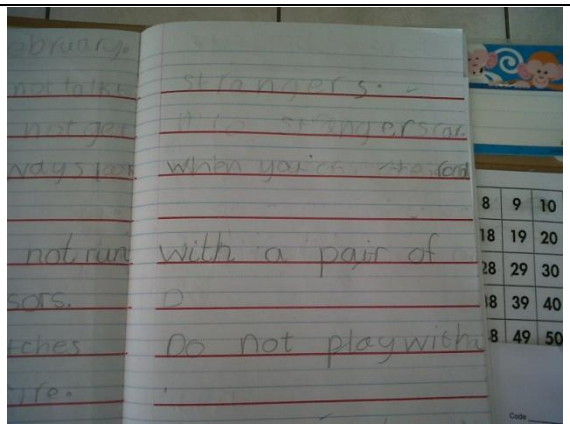

Figure 4.18 Red lined book

Another participant reported to draw columns in the book of a learner who had difficulty spacing her words, as seen in Figure 4.19.

- *"[…], one word in a block… she had difficulty spacing."* (002)

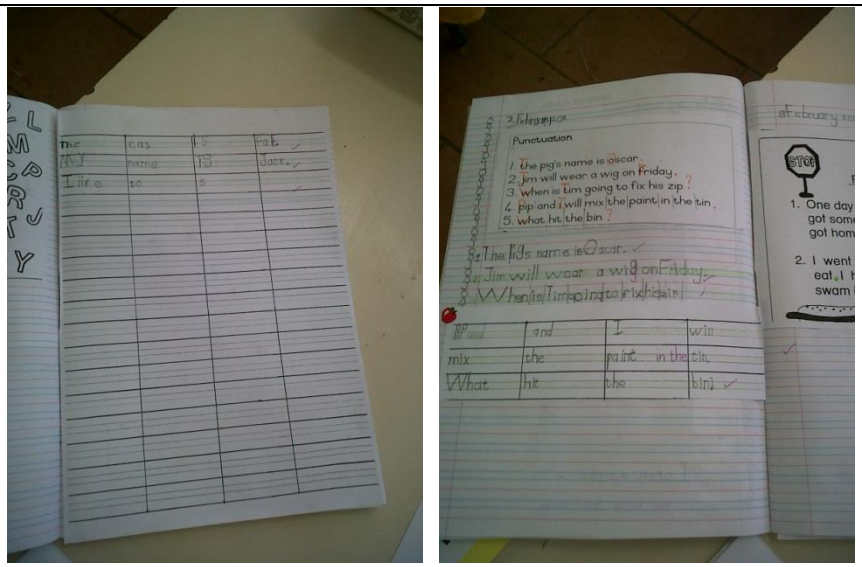

Figure 4.19 Drawing columns in the book

One specific participant reported to use a carved wooden letter guide, as seen in figure 4.20, to assist the learners with letter formations.

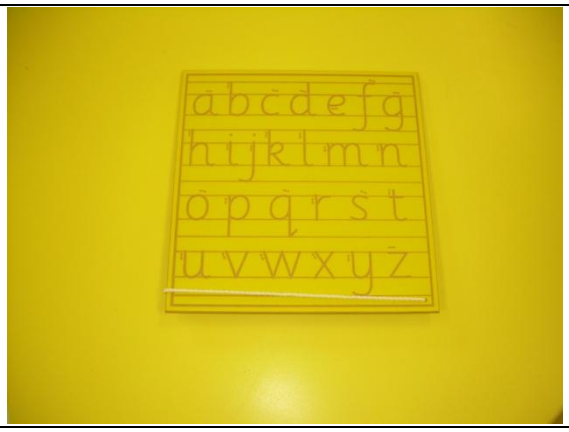

Figure 4.20 Wooden letter guide

Inclined boards were also reportedly effective for learners with handwriting difficulties.

- *"[…], one little one's got a raised board for his handwriting."* (008)

One participant reportedly used weighted cuffs effectively to assist with tremors during writing.

- *"It's to control the movement of their tremors."* (008)

Additional **assistive devices** were also used in order to enhance the learning experience in the classroom. One participant reported to use a yellow screen to place over reading materials to assist with reading difficulties, as shown in Figure 4.21.

- *"I have had great success… especially the kids with dyslexia and tracking difficulties…convergence."* (001)

Figure 4.21 Yellow screen

One participant was reportedly testing a frequency modulation system that assists with reducing background noise, depicted in photograph 4.22.

- *"The FM (frequency modulation) system, it is to cut out all the… background noise."* (001)

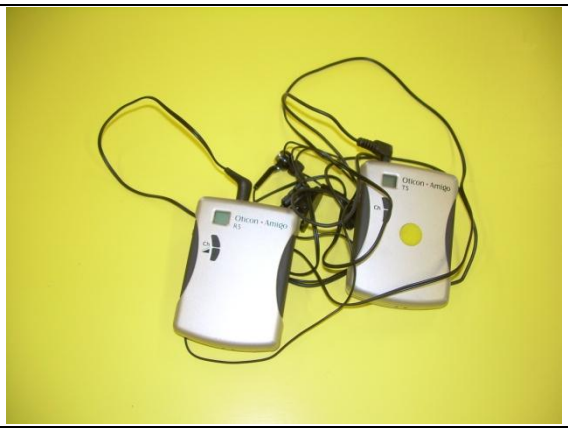

Figure 4.22 Frequency modulating system

4.4.3 Sensory modifications

Sensory modifications are used to improve a learners performance by improving their ability to attain and maintain the optimal level of arousal for learning.[(2)] These sensory modifications can be implemented by changing the space or by providing specific strategies for the participant or learner to perform.

4.4.3.1 Changing the space

The space in the classroom can be adapted in order for the learners' sensory needs to be met. By **creating space** in the classroom or area around the classroom a learner may more readily be able to receive the sensory input he/she requires.

Two participants reported to having used or are aiming to use a tent in the classroom, as can be seen in Figure 4.23. The participants had conflicting opinions regarding the perceived effectiveness of the tent.

- *"[…],we tried in the past, we had a tent… but it became like an issue because a lot of the children would say, 'why can't I go in there.'"* (003)
- *"We had a huge box outside… and then came the tent."* (001)

Figure 4.23 Tent

The use of a sensory garden was also reported by participants as being useful, as shown in Figure 4.24.

- *"That's a quiet space and they can just go and sit there (points to the sensory garden)."* (003)

Figure 4.24 Quiet garden space

One participant reported that the lights in her classroom disrupted the learners and therefore had to make sure she turned them off.

- *"[…], turning off these blaming lights."*(002)

Two participants reported to play music in the classroom. Figure 4.25 shows a CD player that is used in the classroom.

- *"Relaxing music-classical… they were calmer."*(003)
- *"It will calm them."*(007)

Figure 4.25 CD player

4.4.3.2 Providing strategies

Specific strategies were identified that provided learners with the necessary sensory input they required to obtain an optimal level of arousal in the classroom. The introduction of **specialised programmes** into the classrooms was reported to assist in improving the learners' attention and focus.

Two participants reportedly used the Alert Programme in the classroom, depicted in figure 4.26. The effectiveness of the programme was however questioned by one of the participants.

- *"[…], and they actually get focused and do that."* (005)
- *"He has got little things that he knows what to do, to kind of regulate himself… I don't think he does it sufficiently enough… I don't think it's as effective as it could be."* (002)

Figure 4.26 The Alert Programme

The inclusion of a brushing programme was seen as beneficial, where this would be carried out either in class or the learner would be sent to occupational therapy.

- *"We send them to OT (occupational therapy) to brush them."* (006)
- *"[…], so a child that needs constant brushing would probably be a child that has his own personal facilitator."* (008)

Some schools reported the use of **specialised equipment**, such as fidget toys, weighted vests, balls, a trampoline, chewing gum and water bottles that assist calming, relaxing and refocusing the learners.

Fidget toys, such as stress balls, prestic, and putty were reportedly effective in the classroom. Figure 4.27 demonstrates a balloon stress ball that is used in the classroom.

- *"[…],a child that keeps beating like this (on the table) or biting their nails, sometimes it is just a way for them to concentrate… make another plan. The stress ball maybe or little bean bag…"* (005)
- *"I have used stress balls, putt… It not only calms them, but refocuses them… it just relaxes them."* (008)
- *"Sometimes prestic kind of helps."* (001)

Figure 4.27 Balloon stress ball

Two participants reported the effectiveness of apply deep pressure to calm learners. Figure 4.28 shows the pillows that were used by one of the participants.

- *"You see those nice pillows there? And then before breaks I squash them…so they are more at ease during their breaks …both to start the morning and before both breaks…that has really had an enormous effect."* (001)
- *"So another way of calming them down when they are having a huge wobbly is basically hugging or if it gets really bad, wrap them in a blanket."* (008)

Figure 4.28 Pillows used to apply deep pressure

Weighted jackets have been used effectively by one participant in the past.

- *"I have had them (weighted jackets) before in the past."* (008)

Seating learners on balls was noted by one participant to assist with improving a learner's focus, as seen in Figure 4.29.

- *"That's (the balls) good for them…because of the movement it sort of controls their focus."* (008)

Figure 4.29 Ball used for seating

Two participants reported to use oral stimulation in the classroom, such as a chewing stick or chewing gum (Figure 4.30). The opinions of the participants regarding the effectiveness of the oral stimulation was however contradictory, although this may have been dependent on the form of oral stimulations used by the learners. Chewing gum was therefore found to be more effective than a chewing stick.

- *"He gets his chewing gum and chews throughout the day… It has made a huge difference. He is also getting that oral feedback so I also think that is working better."* (001)
- *"He has got a chew stick…but that doesn't work and he uses it as a gun."* (004)

Figure 4.30 Chewing gum

One participant reported on the effectiveness of a trampoline available on the school premises for the learners to use when necessary.

- *"[…], just a little one (trampoline), that they jump on just to refocus."* (008)

One school reported to using water bottles in the classroom to effectively calm the learner.

- *"Each child needs to have a water bottle in his bag everyday so when he feels overwhelmed you can just say take a sip of your water."* (006)

Some participants were unfamiliar with sensory modifications or did not use them in the classroom.

- *"I basically haven't got a child that needs a specific thing at the moment."* (002)
- *"So in class there is not much time because you don't get through all the academic work that you need to if you do that."* (003)
- *"So you know I don't particularly do anything in the classroom."* (004)
- *"No, very unfamiliar with that."* (007)

According to the audit trail the educators' lack of knowledge of sensory modifications may be as a result of the occupational therapists at the schools not being trained in sensory integration, or alternatively, that there is decreased, or not sufficient, collaboration between the occupational therapists and educators.

4.4.4 Curriculum modifications

Modifications are made to the curriculum in order to enhance the learners' interests and attention in the classroom.[(2)] The curriculum needs to be moulded to the needs and interest of the learner.

4.4.4.1 Fitting the curriculum to the learners

The teachers follow the **national curriculum** as closely as possible.

- *"[…], the scheme that has been given throughout the GDE, we generally try and cover what is in there. Sometimes to a lesser or greater degree, depending on the ability of the class."* (001)
- *"We adapt the national curriculum to Spire… we add things in and we do take things away and we look at the advanced programme and some of the concepts are far too abstract for our children."* (008)
- *"We still try to follow the mainstream curriculum because most parents… hoping to get the kids out in two, three years, back to mainstream."* (006)

Adapting to the needs of the learners is in keeping the learners engaged. This can be done by considering more of an individualised programme, breaking tasks into steps or differentiating the participants' expectations.

- *"You have to consider an individual programme… and then you adjust everything, everything that you do although you do the same concept you adjust to his needs…"* (008)
- *"Breaking every single thing you do, every way you teach, whatever you do in very small steps"* (002)
- *"You may differentiate your expectations…or you differentiate the equipment they are allowed to use or the amount of work."* (002)

One participant reported on the effectiveness of using blank books in order for learners to be more creative, as shown in Figure 4.31.

- *"When we are getting into the creative process, there shouldn't be all these boundaries… I do use the blank book more often…they make much more news, much more sentences."* (005)

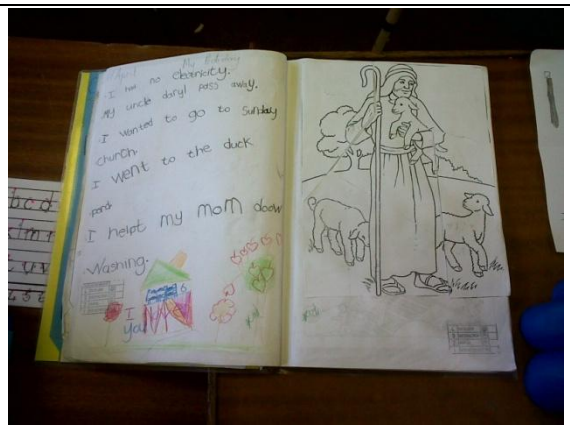

Figure 4.31 Blank paged book

One of the participants has placed her learners on different levels, in order to accommodate for their different learning needs, thereby modifying the worksheets given to the learners. This is demonstrated in figure 4.32.

- *"The basic lesson and how I explain it it's the same but what they have to do on paper that differs…I will give this one that can write, the sentence and then this one just fills in the missing words, and then the very weak group gets simple dots (to trace the words)."* (006)

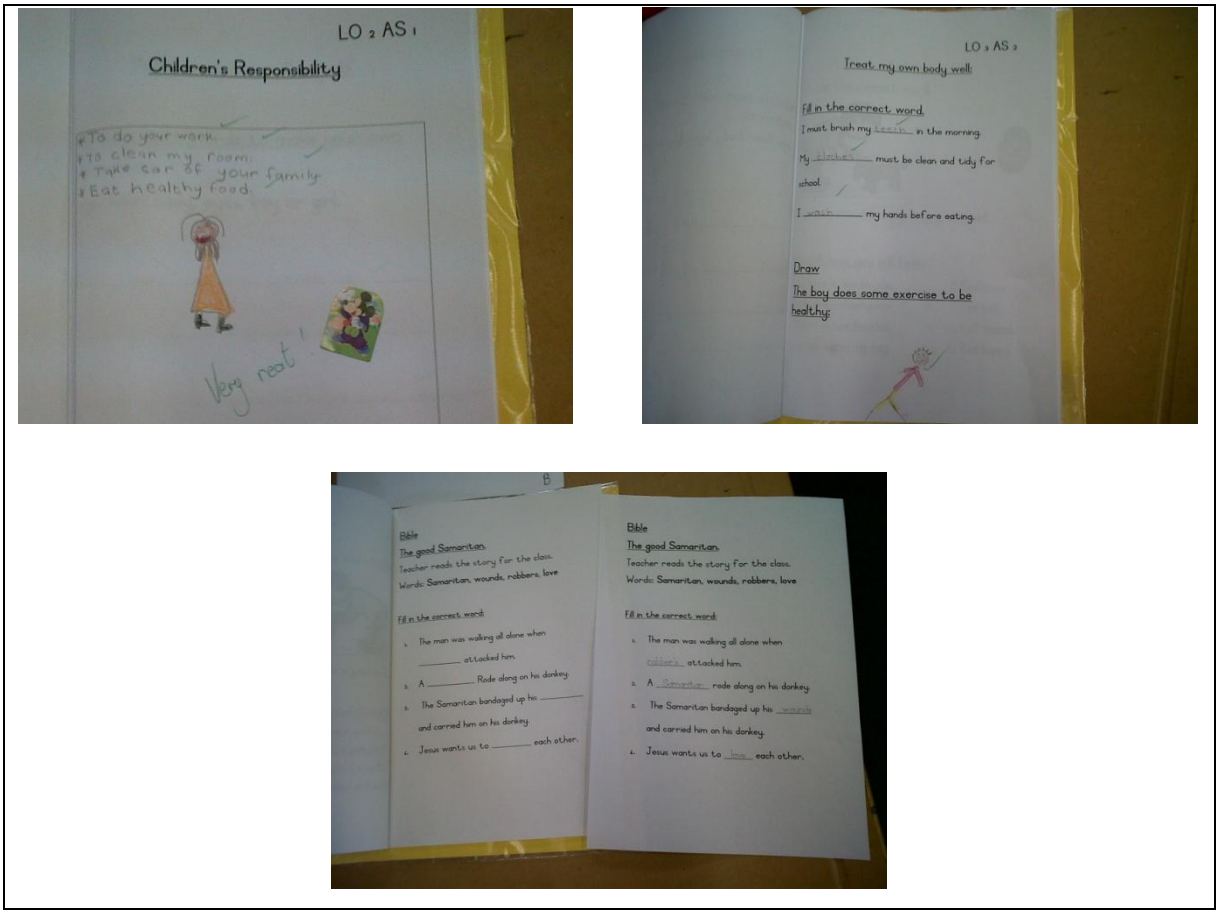

Figure 4.32 Modified worksheets to accommodate for the different levels.

The participants feel it's important to **make learning interesting** in order to gain maximal participation from the learners, by including colour, adding pictures as well as making learning interactive and practical.

- *"The uninterested ones (learners), you try and make it more colourful, more interesting and more pictures to draw their attention in. The ones that are very over stimulated, we keep it simple… It depends from child to child mostly"* (006)
- *"It's very interactive and they are all taking part."* (004)
- *"If we are doing money, it's a little game that they play shop… or where we do road safety, I'd take them to the playground and they pretend they are cars… They like to feel part of it."* (006)
- *"I try and hook them in. If they do something really well… then I do the 'dance of joy'. So I do a little squiggle or whatever and they love that…and I have only once done the dance of sadness."* (001)

4.4.5 Modifications to curriculum delivery

Modifications to the delivery of the curriculum include the way in which the teacher teaches, the different materials that are used and the organisation of the classroom.(2)

4.4.5.1 Organising the class

Creating a level of organisation in the classroom, through routine and structure as well as facilitating the learners through transitions in the school environment improves learner's participation in the academic environment. The participants report that learners thrive off **routine and structure**.

- *"[…], they need a routine, they like routine…they feel more confident, they feel more at ease."* (006)
- *"[…], with the kiddies with learning problems… I stick to my routine."* (007)
- *"[…], everything is highly structured, highly structured, a very structured environment."* (001)

Providing a visual reminder of the classroom routine reportedly assists the learners with unexpected changes in the day.

- *"We've got a daily board… and as we go through on our daily program they tick them off and then they know what's coming next and then if there's a change I will always warn them in advance."* (008)
- *"[…], it's a huge difference. They need to know what is happening in their day and then when there are changes in their day, that is where you deal with them."* (001)

Coping with the **transitions** between lessons and break times facilitates the optimal level of focus and attention. Participants report to giving exercise breaks, sing songs or allow free play.

- *"If they get bored or if they get tired…we will suddenly say everyone stand up and have a quick game of Simon Says…just to get them moving…or do some cross over exercises or breathing exercises or Brain gym type stuff."* (002)
- *"We are trying to implement that Braingym programme…that also settles them and also kind of focuses them…I don't think we have done it regularly enough at this point to be effective."* (001)

- *"Between literacy and numeracy they have got mat time and that's free play… it's to refocus them."* (008)
- *"When they get restless and they find a task quite tedious… I break it with exercise …sing a song… to refocus."* (008)

4.4.5.2 Getting it across

The way in which the teacher executes her lessons plays an important role in delivering the curriculum. Making sure the lesson is **on the right level** of the learners in the class, through concrete practical explanations, repetition and grading.

- *"It is concrete. It is hands on and quite visual."* (004)
- *"All my lessons are practical… whether it's language…or numeracy, even our discussions with life skills… If I can work from a concrete to an abstract way then I would have covered anything."* (005)
- *"They need re-teaching and then they need re-teaching, and re-teaching and…"* (002)

Sometimes it is important to get **extra help**, be it in terms of a facilitator, using different equipment or even getting the learners to use different senses.

- *"A lot of the children here who have huge difficulties have individual facilitators."*

Participants reported that using a variety of different learning materials is important when teaching new concepts. These learning materials may include white boards, number charts, unifix blocks, bottle caps, smart board etc. Figure 4.33 demonstrates different learning apparatus for the learners.

- *"You have got to find out what suits each child."* (004)
- *"[…], white boards…number charts…unifix…money…spray cards."* (003)
- *"[…],bottle caps..beads…seeds."* (005)
- *"We use the smart board… You have got your colour, and your audio and you have got again this hands on approach."* (001)

Figure 4.33 A variety of learning materials

The participants report the importance of using movement, touch, vision, auditory experiences to facilitate a multi-sensory learning experience.

- *"They have got to just see, hear and use their hands if at all possible… You can act it out! If in doubt, act it out.""* (002)
- *"[…], and if you can get that movement involved… it's clapping and almost a rhythmic thing that I try… You have to be careful though…if they are too worried about trying to click their fingers, then they can't count… so it's got to be something simple"* (001)
- *"[…], being a kinaesthetic learner I know how important it is that I use all my senses."* (005)

4.5 Limitations affecting the implementation of environmental modifications

The participants reported limitations they experience in relation to their ability to carry out EMs in their grade two classrooms. These range from limitations in the classroom, to the curriculum and to the participants themselves.

4.5.1 Classroom

One participant reported that the lack of available **resources** in the school environment, relating to the schools budget, impacts her ability to execute EMs.

- *"Whatever environment you are going to be in, you are not going to have absolutely everything you need… You use what is there and if it is not there you either ask or you find out what is around the school or you adapt or you buy."* (002)

Two participants reported that the increased **number of learners** in the class limited their ability to carry out EMs.

- *"I feel if we can go back to that time where you had really eight children… that you can work with full time, it would have been different."* (005)
- *"[…], fewer kids in the class."* (006)

Some participants reported that their **small classroom sizes** impacted their ability to carry out EMs, where they required more space.

- *"I would really like a bigger classroom."* (005)
- *"[…], make this class bigger."* (006)
- *"I suppose, you know it is not that big a classroom to have a reading corner."* (004)

4.5.2 Curriculum

Time constraints affected some participants' ability to carry out EMs in the classroom.

- *"I always find time a huge factor. You run out of time."* (001)
- *"Time is a huge limiting factor."* (004)

The **large curriculum** that the learners are required to complete within the year is reported by some participants to affect their ability to carry out EM.

- *"To not have to go through so much work in such a short time. I would like for the curriculum just to be lessened a bit for LSEN schools."* (006)

4.5.3 Participants

One participant reported that her **lack of skills** impacted her ability to implement EMs in the classroom.

- *"The biggest limitation to myself, is my personal skills my lack of administration."* (005)

Although it was not directly reported by any of the participants, it was noted in the audit trail that there was a lack of skills in terms of the implementation of EMs in the classroom. Therefore, teacher training in implementing EMs in the classroom may be beneficial.

Some participants reported that their **other responsibilities**, such as administrative duties, impacted their ability to implement EMs.

- *"The pressure of the administration and paper work."* (005)
- *"Admin absolutely and all this nitty gritty that comes with it."* (007)

4.6 Conclusion

The findings demonstrate that the participants were able to described different EMs and how they were used in their classrooms. The EMs described by the educators were analysed and linked to the five categories identified by Mulligan[2] as well as taking into account the environmental contexts identified in the OTPF II[4]. The researcher together with the supervisor reviewed the findings through an inductive process in order to best reflect the data, by establishing the categories. The participants were able to comment on the effectiveness of the EMs that they implemented in their classroom. Some participants identified factors that affected their ability to carry out EMs in the classroom. These findings will be discussed in relation to the objectives of the study in the following chapter.

CHAPTER 5: DISCUSSION

5.1 Introduction

This chapter discusses the findings of the research and conclusions drawn from the study. The impact of the participants' demographics as well as the demographics of the participants' classes will be discussed in relation to the findings. An in depth discussion of the EMs used in the grade two classes of LSEN schools is presented, and how these relate to the environments and context of the classroom. The perceived effectiveness of the EMs as well as the limitations experienced by the participants to carry out EMs in the classroom will conclude the discussion.

5.2 Demographics

A heterogeneous sample of the existing LSEN schools was obtained for the study, as the schools that were visited spanned across the greater Johannesburg region. An equal distribution of schools from the Department of Basic Education and Independent Schools Association of South Africa was obtained in the sample.

Although the participants were relatively homogeneous, when comparing the participants from government and independent schools, the government school participants are slightly younger than the participants at the independent schools. This may indicate that independent schools employ educators with more experience. Similarly all of the participants from the independent schools had remedial qualifications, although only half of the participants from the government schools had remedial qualifications. This may indicate that independent schools have more specialised teaching staff than government schools. Taking into account that the most qualified educators were interviewed in each grade, this is not a true reflection of the percentage of educators that have remedial qualifications in each school, but rather a reflection on the availability of remedially qualified teachers in grade two.

In review of the field notes, definite differences were noted between the knowledge of participants at government schools and the knowledge of participants at independent schools, relating to the level of training of the participants. In general the participants at independent schools seemed to show greater insight into the needs of the learner with LDs, demonstrating a deeper understanding of the learners' difficulties, and attempted to keep up to date with

recent literature and modifications in the classrooms. The variety and diversity of EMs used by participants at government schools is therefore less.

Although the participants tended to report on the EMs they currently use in the classroom, they are also relying on past experience from previous years of teaching. Therefore although the profile of the participants' current class is of relevance, prior experience also contributed to their knowledge and use of EMs in the classroom. The significance of the class profiles is therefore reduced in relation to the data gathered as the participants past experience plays a large role in the EMs that they use currently.

Government schools had on average more learners in the class than independent schools, although the difference was not significant. Government educators are therefore faced with the challenge of larger numbers of learners in their classes. The range of learning disabilities was fairly heterogeneous over the sample, where no significant difference was noted between government and independent schools. The profile of learning difficulties is therefore similar across all schools and between government and independent schools.

All LSEN schools that were initially located on the internet or additional resources were all based in traditionally middle class or upper class socio-economic areas (predominantly white areas) of the greater Johannesburg region. No LSEN schools for learners with LDs were located in lower social-economic class areas (predominantly black areas), even when investigating resources from both the Department of Basic Education and the Independent Schools Association of South Africa. This indicates a lack of specialised schooling services for LSEN, in particular LDs, in the low socio-economic areas. Learners from low socio-economic areas are therefore required to travel sometimes long distances to access these schools. Access to schools for LSEN is therefore limited, and not well distributed within the greater region of Johannesburg. According to the White Paper 6[(1)] the imbalance between the availability of LSEN schools according to socio-economic status is primarily a result of decades of segregation and systematic under resourcing in predominantly black areas (low socio-economic areas).

5.3 **Environmental modifications**

Overall a wide variety of EMs were discussed by the participants. These ranged within all categories defined by Mulligan[(2)] as well as covering the physical and social environments and cultural, virtual and temporal contexts defined by the OTPF II[(4)].

During the interviews the EMs that were discussed were not isolated to the categories identified with by Mulligan[2], demonstrating a diverse relationship between the EMs. Through sequential data analysis these EMs were assigned to the categories defined by Mulligan[2]. Although clear categories were defined, repetition occurred between some of the categories, demonstrating the diverse interdependency between the EMs. For example, when some participants attempted to modify the social environment in terms of behaviour modifications, physical modifications and sensory modifications were used in order to affect behavioural change. Although an attempt was made to create clear categories according to Mulligan's[2] predefined categories, one must keep in mind the interdependency between the categories.

Although clear definitions of the modifications to the curriculum and delivery of the curriculum were identified, it was often difficult to separate these two categories, as these are often concurrent in terms of teaching and content. By modifying the curriculum one is modifying the way in which the curriculum is taught, and therefore delivered. These two categories will therefore be discussed simultaneously.

At times other components were discussed that fell outside the scope of the environment, but were important in developing the context of how or why modifications in the environment were implemented. These factors, such as understanding the context of the learner, or defining the curriculum are therefore discussed, merely to give context of the implementation of EMs, as opposed to being EMs themselves. This confirms the importance of analysing contexts within the environment.

Participants found it important to understand that each learner presented with unique and diverse difficulties. This is supported by Nelson, Copley, Flanigan and Underwood[21] who point out that LDs are a diverse group of disabilities and that each learner can present with a variety and exclusive combination of difficulties.[21] The modifications that are used therefore vary greatly and are dependent on the unique difficulties of the learner. Therefore it was made clear that no one modification will work for all learners and a combination of modifications will need to be trailed and tested in each classroom. Fiore, Becker and Nero[70] highlight the importance of a multi-modal approach.

5.3.1 **Behavioural modifications**

The behavioural modification category was broadly discussed by all participants, identifying a variety of behavioural modifications that are used in the classroom. Participants discussed

how by understanding the learner's context and difficulties, they could modify the social environments by emphasising the cultural context within the classroom. They used rule setting and clarification of boundaries, modelling behaviour and self-reflection of the learners, negative and positive reinforcements, as well as modifying the physical environment.

Before modifying the environment the majority of the participants found it important to first identify the origin of the behavioural difficulties presenting in the classroom. By addressing the origin of the behaviours directly the behaviours themselves may improve. Bundy et al[19] describes the benefit of occupational therapists increased understanding of the unique differences and learning difficulties experienced by learners with LDs. Occupational therapists should therefore assist the educator to view each learner's behaviour from a new perspective so as to adapt or modify situations or activities for each learner to reduce problem behaviours. Additionally by reframing the learner's behaviours, the educators become more tolerant of behaviours that are directly related to the LD. Participants report that they found a positive reaction was more effective than reacting negatively towards difficult behaviours that result from the learner's LDs.

Once understanding the nature of the learner's behaviours certain handling principles were identified by the participants that assist with modifying behaviours in the classroom. All participants identified the importance of setting rules and creating boundaries as a key modification to the cultural context in order to manage undesirable behaviours. Gardill and Du Paul[(8)] emphasise that classroom rules should be reviewed regularly and be clear, specific and concise. Evidence of the implementation of rules in the classroom was observed through the use of posters in the classroom. All participants reported that setting rules and creating boundaries in the classroom is highly effective as the learners then know what is expected of them. Behavioural standards are therefore clarified to the learners within the cultural context of the classroom.

Additional modifications in the form of handling principles that were reported by the participants include the way in which the participants model behaviour within the classroom as well as the importance of facilitating self-reflection amongst the learners. Some participants reported that modelling optimal behaviour standards within the cultural context and social environment of the classroom positively influenced the learners' behaviours. By facilitating self-reflection in the classroom learners were reportedly able to monitor their own behaviour better.

Cognitive-behavioural strategies emphasise independent problem solving and self-control of learners.[8] One specific school reported to use a cognitive-behavioural programme known as the Cognitive Enrichment Approach. The school reported to introduce a different theme each week, for example 'sharing behaviour' or 'self-regulation', reinforcing the theme through assemblies, posters in the classroom and facilitation of the educators. The participant discussed this approach with much enthusiasm and descriptive examples demonstrating dynamic implementation of the programme in the classroom expressing her delight with the success of the programme. Cognitive-behavioural strategies were therefore deemed effective in this school environment, where other schools may benefit from the implementation of this programme.

The use of positive and negative reinforcements was also broadly discussed by the participants within the cultural context of the classroom for behaviour modification. Positive rewards for the learners included using praise, star charts and merits. Evidence of the use of star charts and merits was seen on the walls or boards of some of the classrooms. These are similar to the positive reinforcements discussed in the literature.[2, 8, 34] According to the literature the reinforcements should be in direct view of the learners in order to motivate them.[34] This was evident in the classrooms as the star charts and even negative demerits were always placed at the front of the classrooms in direct view of the learners.

Some participants reported to using demerits, lining up or writing out as negative reinforcements. They felt that this was effective as the learners were better able to remember what they had done wrong and the negative reinforcements could be used as a threat to stop the undesirable behaviour. Evidence of the use of a demerit system was observed on one of the boards of the classrooms and although seen as effective by this participant literature more commonly found that negative reinforcements should take the form of direct and brief reprimands, a loss of privileges or time out.[8]

There was a difference in the type of reinforcements that were used by the participants from government schools and those from the independent schools. Most of the government school participants tended to use both negative and positive reinforcement strategies in the classroom, where most independent school participants felt that negative reinforcements were ineffective, preferring to use positive reinforcements. One government school participant reported that positive reinforcements did not assist with modifying behaviours, where learners just sought the quick reward. Another government school participant reported that the

disruptive learners did not care about both negative and positive reinforcements and therefore implementing reinforcement strategies were a challenge for her. In support of the literature discrepancies exist between the opinions of the different participants on the effectiveness of positive and negative reinforcements.[8] It appears that the use and effectiveness of both positive and negative reward systems is dependent on the opinion of the participants.

One participant emphasised the need for being consistent in the application of behavioural modifications in order to be effective in enforcing behavioural standards. This concept was also addressed by Gardill and DuPaul[8] when they emphasised the need for consistency and immediate consequence in behavioural management. The researcher questioned the consistency of the participants when implementing handling principles and reinforcements, questioning whether the consistency of implementation impacted the effectiveness in modifying behaviour. In one classroom the merit system had dates written when each merit was given, there were no recent merits recorded, questioning whether this strategy was in fact implemented consistently in the classroom.

The last strategy discussed by the participants in behavioural modifications was the influence of peers on each other in terms of their social position and placement in the classroom. By placing the learners in relation to each other as well as in the classroom, the social environment can be modified. The participants described how peers influenced each other's behaviours. Learners that were disruptive where therefore separated and placed next to peers that would model more desirable behaviour and in this way desirable behaviours were maximised and undesirable behaviours were minimised. This is in support of the literature as peer modelling encourages appropriate behaviour, monitoring of behaviour and the provision of organisational cues.[8, 33-34]

The location of the learners within the classroom was also found to impact the social environment. The proximity of certain learners to the educator was therefore important. Some participants found it more effective to place disruptive learners at the back of the class so that they did not distract other learners, which is in agreement with the findings of Carbone[34]. Other participants preferred to have disruptive learners close to the educator's desk so that they could keep an eye on them. In so doing the learners can benefit from regular feedback, monitoring and/or assistance from the educator, as affirmed by Carbone[34]. Placing disruptive learners in their own corner was deemed unsuccessful by one participant as it worsened behaviours, while two other participants reported that they separate disruptive learners into

cubicles, although the effectiveness of this varied. Participants in general reported that by modifying where learners were placed in proximity to others, or within the classroom as a whole the social environment of the classroom could be modified effectively in response to the needs of the learners.

As the implementation of behavioural modifications could not be observed, the effectiveness of these modifications could not be verified. The effectiveness of the modifications was therefore dependent on the views of the participants and can be influenced by a participant's personality and experience. The youngest participant commented how she had not found a strategy of handling the learners' behaviours that worked for her, and she was struggling to manage undesirable behaviours in her classroom. This brings into question the need for experience in being able to implement behavioural modifications effectively in classroom. The other participants were however able to identify clear modifications to the social and cultural contexts of the classroom in order to modify behaviours.

5.3.2 **Physical modifications**

Numerous physical modifications to the classrooms were identified and discussed by all participants. These modifications relate directly to the physical environment of the learners. From an objective perspective the participants found these modifications the easiest to discuss due to their tangible nature. This also allowed for verification of the implementation of these modifications in the classrooms through photographs. Physical modifications were made to the classroom as a whole as well as for specific individual learners in consultation with occupational therapists.

All participants used modifications related to furniture arrangement and the general classroom appearance, reporting that this affected the academic performance of learners in the classroom. No general trend in the way that desks were arranged was observed, as it depended on the participants' preferences as well as the availability of the desks at the schools. Single desks arranged in rows were the most common arrangement used and observed in the classrooms. Participants gave reasons for the arrangement of the desks which ranged from the specific levels of function of the learners, dynamics of the learners' needs and space in the classroom. Some participants reported changing the desk arrangement depending on the activity engaged in. One specific participant was able to use a combination of desk arrangements in her classroom, therefore accommodating for a variety of learning needs. The effectiveness of desk arrangement on classroom performance is therefore thought

to be dependent on the educator and activity the class is engaged in, rather than one specific layout being the best. This is congruent with findings in the literature, where varied opinions exist on the optimal desk arrangement.[8, 34]

All participants were aware of the impact of visual and auditory distractions in the classroom on the learners' ability to concentrate. Ways in which they attempted to reduce this was to keep the front of the classroom less busy, using calm colours and covering busy areas such as the lockers.

When physical modifications were considered many of these were already part of the school design and had not been introduced by the participants. The participants reported on those structural components that they felt were effective. These included features that were specifically designed to reduce visual distractions from the outside environment such as; having elevated windows, using textured glass, having curtains or limiting the amount of windows in the classroom. These existing structural modifications were more commonly observed in government schools, possibly as the government schools were housed in traditional school buildings where half of the independent schools were housed in renovated houses.

Some classrooms were carpeted in order to reduce auditory distractions in the classroom. One participant placed tennis balls on the feet of all the chairs in order to reduce the noise resulting from the chairs scrapping on the floor. The use of a frequency modulation system to block out background noise so a specific learner could focus on the participant's voice was currently being trialled by another participant. These modifications are consistent with descriptions in the literature, where reducing visual and auditory distractions is essential in affecting a learner's ability to concentrate. The modifications were consistently described as effective by the participants that used them in reducing distractions in the classrooms, although some participants did report that it was difficult to eliminate all distractions.

In terms of furniture participants indicated that it was essential that desks and chairs were correctly sized for each individual learner in order to optimise the learner's academic performance. This is congruent with findings by Smith-Zuzovsky and Exner[36] where it was found crucial that chairs and tables are the correct height for learners. In those schools were a variety of desks or chairs were not available learners were provided with footrests, or desks were tipped by placing blocks under the one side of the desk.

Participants reported that learners that had an optimal seating posture at their desk were able to carry out academic tasks more effectively. The use of balls, wedges, material pillows or disc-o-sit cushions in the classroom was reported by the participants as effectively optimising certain learners seating postures. This is congruent with studies performed on the effectiveness of balls and Disc-o-sit cushions on seating postures.[37, 39, 47] One of the schools had specially designed chairs to optimise seating posture, which were reported as being highly effective in promoting optimal seating position. Some participants found that by using larger desks to give the learners that had difficulty organising their desk space an adequate amount of space, their academic performance improved.

With the assistance of occupational therapists participants made modifications to the writing tools used in the classrooms. The following modifications were made to enhance the quality of a learners handwriting; pencil grips, elastics on pencils, triangular pencils and clutch pencils. Despite Asher[40] not finding any significance of the use of the writing tool and grip to improve handwriting performance, Asher did mention that the choice of grip and tool was specific to each learner and their needs. The above mentioned pencil modifications were reported by the participants as being child specific and could not be generalised to all learners. None of these modifications were photographed as they were in the possession of each learner.

Participants at different schools also reported to using a variety of different books to facilitate neat handwriting. Some participants found large lined books more effective, where others preferred using irish lines. One school provided the participants with special designed books which had two blue lines alternating with one red line to facilitate correct placement of the words on the lines. Another participant drew columns in a specific learner's book in order to successfully facilitate spacing between words. The participants did report that the type of paper used for writing again depended on the specific learner, rather than the class as a whole which is congruent with the findings of Asher[40] who supports individual modifications to books or paper used for writing to suit each learner. All the participants reported that these modifications had a positive influence on the learner’s handwriting.

Additional assistive devices were described by participants to assist with improving writing or reading difficulties. The use of inclined surfaces or weight cuffs was reported to be effective in facilitating neater handwriting. One participant reported that using a carved wooden letter guide to prompt correct letter formation effectively improved a child’s letter formations. The

same participant reported that using a yellow plastic overlay was effective in helping a child with reading difficulties such as dyslexia.

The implementation of most of the physical modifications was verified through the use of photographs. Not all physical modifications could be photographed as some of them were in the possession of the learners, or the participants had only used them for specific learners in the past and did not currently have learners using those modifications at present.

5.3.3 Sensory modifications

Sensory modifications in the classroom were not as commonly used as the other EMs. Some participants were unfamiliar with the field of sensory integration and therefore were not familiar with sensory modifications that could be applied in the classroom. Bearing in mind that 70% of learners with learning difficulties are diagnosed with sensory integrative dysfunction the sensory integrative approach is one of the most common approaches used by occupational therapists with learners with learning difficulties.[21, 26] According to Mulligan's[2] study sensory modifications in the classroom were reported to be used the least frequently and were the least effective. She also hypothesised that this may be as a result of decreased input to educators from the occupational therapists.[2]

It is the role of the occupational therapist to work collaboratively with the educators in reframing the learner's difficulties as well as applying sensory modifications in the classroom. However in South Africa sensory integration qualifications are offered as a postgraduate qualification and not all therapists are therefore trained in sensory integration. Educators may therefore not have the opportunity of working with an occupational therapist who is familiar with the sensory integration approach and cannot assist with implementing sensory modifications in the classroom. Unlike the strategies and modifications described above these modifications are highly dependent on consultations with an occupational therapist, and are child specific.

Although sensory modifications are specific to sensory integration difficulties, these modifications themselves can fall into the behavioural modification, physical modification and modifications to the delivery of the curriculum categories. This section has not been integrated under these headings in this research in order to highlight the current knowledge and use of sensory modifications in the classroom as this is an important form of EMs introduced by occupational therapists in the classroom.

The participants in this study identified some sensory modifications that are implemented either in the form of modifying the sensory environment or by providing specific strategies in the classroom. These modifications are therefore made to the physical environment as well as the temporal context.

According to the participants some learners can become over aroused by the classroom environment, and they find modifications made to the classroom environment can be effective in limiting the influence of environmental factors on their arousal level. Two participants reported on specific learners making regular use of quiet spaces or spaces that reduce visual input, such as a tent, box or outside garden area. Participants also reported that playing calming music or turning off obtrusive lights made a difference to certain learners' level of arousal. By making these modifications the participants felt that it improved the academic performance of the learners who displayed specific types of sensory integrative dysfunction, but the effectiveness of these modifications were again dependent on the specific learner.

Specific sensory integration programmes that were designed to increase or decrease a learner's arousal, such as the Alert programme and a brushing programme, were also implemented in the classrooms of some participants. Specialised equipment was introduced into the classrooms based on the principals of the Alert programme, these included: fidget toys, such as prestick, stress balls and putty; oral stimulation activities such as water bottles, chewing gum or chewing sticks; proprioceptive and deep pressure activities such as weighted vests or squashing with a pillow; as well as movement opportunities such as the use of balls, trampolines or Disc-O-Sit cushions. Very few of the sensory modifications in the classroom have formally been researched, as to their effectiveness except for the use of weighted vests and balls which have been shown to be effective in improving academic performance.[37, 39, 48-49] The perceived effectiveness of these strategies varied between the participants, and were dependent on the specific learners difficulties.

Numerous photographs were taken of the implementation of sensory modifications in the classroom, verifying their implementations in the classroom. These modifications were more commonly used in independent schools than the government schools, possibly relating to the level of experience and training of both participants and occupational therapists at the independent schools. The perceived effectiveness of sensory modifications varied greatly between participants, where it was considered to be the least effective modification implemented in the classroom. This correlates with Mulligan's[2] findings.

5.3.4 Modifications to the curriculum and the delivery of the curriculum

Despite LSEN schools being required to follow the national curriculum, the curriculum can be moulded in accordance with the needs and interests of the learner in terms of how it is delivered, corresponding directly with the aims of the Education White Paper 6.[1] As discussed earlier, the curriculum itself falls outside the scope of the environment. However the way in which the curriculum is delivered in order to meet the needs and interest of the learner, falls into both the physical and social environments as well as temporal and virtual contexts of the classroom. Participants identified effective ways in which they to organise the class to assist with the delivery of the curriculum as well as ways in which they got the curriculum across to the learners in order to take the learners specific needs into account.

Most of the participants found that learners required routine and structure, allowing them to feel more at ease. Some participants reported to giving the learners a visual guide of the routine for the day or week allowing learners to be more prepared for changes as well as knowing what to expect in the day. In Mulligan's[2] study classroom routine and structure were most commonly used and were considered the most effective modifications. Literature also supports the effectiveness of daily schedules and visual cues.[8, 33] In agreement with this the participants found it was effective to provide learners with strategies to assist with transitions between activities by doing exercise or engaging in free play. Others used movement or singing songs to break up tedious tasks which as the literature indicates also allows for transitions to be more fluid and predictable, providing learners with cues and allowing them time to prepare for the next activity.[33, 58]

The participants report to taking the learners specific needs into account when implementing the curriculum. It was therefore important to present objects such as worksheets or books in a way to accommodate for the learners needs. Tasks were broken into steps and participants reported to differentiating their expectations of the learners. Similarly tasks needed to be presented on the right level for learners' effective participation in the academic tasks. Tasks were therefore concrete, concepts required regular repetition and lessons were very practical. These were found by the participants as effective ways of meeting the learners' needs and presenting information on the right level for the learners.

The participants describe that the learning experience should be made interesting for learners, by adding colour or pictures, making it interactive and trying to engage them. However participants do report that the efficacy of these modifications depends on the learner. Similarly

some literature warns against highlighting or adding irrelevant information as this can create a distraction for the learner.[56] But as a result of learner's different temperaments, personalities and interests a variety of different modifications are required, including colour, novelty, creativity and physical interaction to enhance a learners interest in the task.[2, 8, 34] Participants report to using facilitators, a variety of different equipment and include different sensory modalities in the way they deliver the curriculum. Similarly the literature describes how the repetition of activities, using practical and concrete exploration, as well as multi-sensory tools can enhance learners motivation to engage as well as learn new concepts.[59]

Participants therefore demonstrate active implementation of curriculum modifications and modifications to the delivery of the curriculum. This is expected as this is a large focus of remedial teaching. Occupational therapists can however play a role in the implementation of these modifications in the classroom, by making recommendations based on the specific learning needs of learners, specifically relating to occupational therapy related difficulties.

5.4 Categorising environmental modifications in the classroom

According to the findings the EMs in the classroom can be divided more succinctly into three categories, namely behavioural modifications, physical modifications and modifications to the delivery of the curriculum. Sensory modifications are implemented through behavioural and/or physical modifications and therefore fall directly into these categories. As mentioned previously it was difficult to separate the modifications to the curriculum and the delivery of the curriculum as they are often concurrent in terms of teaching and content. These two categories were therefore grouped under modifications to the delivery of the curriculum, bearing in mind the limitation of the curriculum as not being defined as the environment in accordance with the PEO model[13]. These categories do however continue to display a diverse interrelationship, as they influence each other and cannot be viewed in isolation. Therefore physical and social environmental modifications are described, bearing in mind the impact of the temporal, cultural and virtual contexts in these environments.

5.5 Participants perceptions of limitations to executing environmental modifications

The participants identified factors that limited their ability to implement EMs in the classroom. These limitations included factors from the classroom, curriculum and participants themselves.

Limitations to the classroom itself included a lack of classroom resources, small classroom size as well as the large number of learners in the class. The participants reported that the size of the classrooms impacted their ability to have a variety of allocated areas in the classroom, for example a reading corner, or quiet space. Mulligan[2] emphasised the importance of having classroom resources, such as space and learning materials in order to carry out EM effectively. The availability of resources is also impacted on by the schools available budget, in terms of educator training as well as purchasing of tangible EMs. Mulligan[2] also reports that a smaller number of learners per class with additional support would maximise effective teaching. This links to the comparison of number of learners in classes between government and independent schools, allowing independent schools more contact time per learner as their number of learners per class are less. The presence of individual facilitators, financed by the individual parents, in one of the independent schools also assisted with managing the number of learners in the class and allowing more frequent educator-learner contact time.

Participants also reported that the demands of the predetermined curriculum and limited time in the day affected their ability to carry out EMs in the classroom. LSEN schools are however required to maintain the level of the mainstream education despite being a school for LSEN.[16]

One participant also reported that a lack of administrative skills impacted her ability to carry out EMs. It was also noted that some participants were unfamiliar with certain EMs that could be applied in the classroom, such as sensory modifications. A need for more knowledge, through further education and training of the educators was identified as well as encouraging greater collaboration with sensory integration trained occupational therapists. Through education and training the educators skills for implementing EMs would therefore be enhanced. [2]

5.6 Limitations of the study

5.6.1 Effectiveness of environmental modifications

The specific effectiveness of each strategy was not always rated by the participant. According to the field notes, most participants tended to comment on modifications that they were currently using, thus indicating that they were effective unless otherwise specified. The effectiveness of the modifications was also based on past experience. By having negative experiences or no results from certain modifications, it meant that these modifications were

discontinued. Participants therefore rarely commented on modifications that were not effective. Most of the time the modifications that are currently used are considered to be effective and educators are therefore continuing to use these modifications. In the same way it was difficult for them to remember old modifications that were ineffective. If ineffective they did not use them and therefore did not comment on them.

The effectiveness of the modifications was purely from a subjective point of view and was not based on any empirical evidence. The effectiveness of each modification was also difficult to assess as these modifications are not done in isolation, but instead in combination with a variety of EMs. The strength of the effectiveness of the EMs in this study is therefore weak, and does not indicate the true effectiveness of the EMs, and is therefore a limitation of the study.

5.6.2 Collaboration between occupational therapists and educators

It was evident when investigating the sensory modifications in the classroom that there is a lack of meaningful collaboration between occupational therapists, that are sensory integration trained, and educators. This impacts the implementation of sensory modifications in the classroom as well as understanding a learner's sensory needs and behaviours. The strategies suggested by the Department of Education[16] are empowering educators to adapt the environment of the classroom to address the needs of the learners. However, the role of the occupational therapist is still of great importance in identifying specific learner's barriers to learning[13] and therefore plays a vital role in modifying the classroom environment according to these learners needs. According to Cable and Case-Smith[31] occupational therapists reported that direct intervention in the classroom together with consultation with the educator was the most beneficial form of intervention, best addressing the learner's needs. Reduced collaboration

5.7 Conclusion

In agreement with the OTPF II the success of the learner's occupational engagement in their specific contexts is therefore dependent on the environments in which they are engaging. With appropriate modifications to the environment a learners ability to achieve success is increased.[4] This study has therefore clearly identified the extent of the educators' knowledge of EM's in the classroom, as well as which EM's are implemented and how they are used in grade two classrooms of LSEN schools for learners with LDs. These environmental

modifications have been categorised more succinctly into behavioural modifications, physical modifications and modifications to the delivery of the curriculum. Although limitations of the study exist, limiting the identification of the extent of the effectiveness of the EMs in the classroom, educators were able to identify which EMs they perceived as being effective.

The environment is therefore not only a tangible concept but all factors that are external to the learner, creating the behavioural standards and patterns of activity within the classroom. By the educator modifying all these aspects of the environment with the help of the occupational therapist in identifying the specific needs of each learner a learner's academic performance can be enhanced within the classroom environment, reducing their barriers to learning.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

Conclusions will be drawn regarding the aims objectives and findings of the research. This chapter additionally discusses recommendations arising from the research itself as well as the prospects for future research in respect to this study.

6.2 Conclusion

The aim of this study was to explore the use and perceptions of EMs used by educators to improve academic performance of grade two learners with LDs in LSEN schools. The specific EMs that were implemented, how these EMs were implemented, as well as the effectiveness of the EM's needed to be determined. By identifying which EMs are effective in reducing barriers to learning, occupational therapists will be able to recommend suitable EMs that can be implemented into classrooms for LSEN according to each individual learner's needs.

A qualitative research design was used in order to carry out the semi structured interviews with grade two educators in LSEN schools. All schools and the educators interviewed at these schools were required to meet the inclusion criteria of the study. These interviews were conducted at each school, in the classrooms of the educators. Triangulation of data was performed through the transcription of the interviews, photographs taken of the tangible EMs as well as the use of an audit trail. Rich thick data was therefore collected by the researcher. The research design and procedures therefore allowed for a thorough investigation of the current EMs that are used in classrooms to improve the academic performance of grade two learners in LSEN schools. Through thorough data analysis and code checking clear categories, sub categories and codes were identified by the use of a priori approach. Thus allowing the findings to be adequately analysed and discussed in terms with the predefined categories by Mulligan[(2)] as well as the environments and contexts defined by the OTPF II[(4)].

A wide variety of EMs were identified by the participants describing how these EMs were implemented in the classroom. The effectiveness of the EMs was however related to the subjective view of the educators and varied depending on the educator. The effectiveness of EMs was also impacted by the specific learners. As a result of the individual needs of the learners not all EMs could be generalised to be useful for all learners, where their individual

needs needed to be taken into account. The occupational therapist can therefore assist in identifying which EMs needed to be applied to which learners, specifically in terms of applying EMs for specific physical, cognitive and sensory difficulties.

The variety and diversity of EMs used in the classrooms was seen to be affected by the demographics of the participants. Participants from government schools seemed to use less EMs than participants in independent schools, possibly relating to level of qualification and teacher training. Some participants also reported limitations that affected their ability to carry out EMs in the classroom.

The educators were able to describe the modifications to the curriculum and delivery of the curriculum with ease as these modifications relate directly to remedial training and intervention. A variety of physical modifications were discussed and a large amount of evidence was received regarding the implementation of these modifications in the classroom due to their tangible nature. Some participants found it more difficult to discuss the behavioural modifications implemented in the classroom, although a wide variety of these modifications were reviewed. The sensory modifications were reported as being the least effective, as educators opinions often varied on their effectiveness. Some educators were also unfamiliar with sensory modifications, possibly indicating a deficiency in educator training and occupational therapist–educator collaboration. The sensory modifications overlapped into the physical modifications, behavioural modifications and modifications to the delivery of the curriculum categories. Difficulties were also noted in discriminating between the curriculum modifications and modifications to the delivery of the curriculum.

In conclusion the EMs in the classroom were divided into three categories, namely behavioural modifications, physical modifications and modifications to the delivery of the curriculum. The diverse interrelationships of these categories indicate how these modifications cannot be viewed in isolation. Physical and social EMs are described, taking into account how the temporal, cultural and virtual contexts of the learner with LDs can be modified in order to enhance their academic performance. By the educator modifying all these aspects of the environment with the help of the occupational therapist in identifying the specific needs of each learner, the learner's academic performance can be enhanced within the classroom environment, reducing their barriers to learning.

In agreement with the OTPF II[4] and PEO model the success of the learners occupational performance is therefore dependent on the environment in which the learner is engaging and

with the environment being modified appropriately this has assisted the learner to achieve success. This study has therefore clearly identified ways in which the classroom environment can be modified in order to achieve improved academic performance. Although limitations of the study exist, suggestions of future research as well as recommendations have been made, which can further investigate related themes of this research.

6.3 **Recommendations**

Occupational therapists have specific skills sets allowing them to accurately assess, identify and assist in limiting the barriers to learning of learners with LDs. It is therefore vital that occupational therapists collaborate with educators in order to suggest modifications in the classroom in which these barriers to learning can be minimised. In addition to this occupational therapists are required to educate teachers on the variety of barriers learners with LDs present with and ways in which these barriers can be managed in the classroom environment. This research identified that while educators were familiar with behavioural and physical modifications they were mostly unaware of sensory modifications that can be made in the classroom. It is therefore recommended that in this aspect particularly occupational therapists play a greater role in assisting educators in this area. Occupational therapists are trained to play an important role in empowering educators in implementing the variety of EMs that can be incorporated into the school environment.

Resources for occupational therapists to assist with the implementation of EMs in schools should be increased, to allow for a greater variety of EMs being available to educators. This may take the form of training workshops or the provision of tangible resources related to EMs.

This research identifies a wide variety of EMs that are used in LSEN schools for learners with LDs. With the implementation of inclusion strategies in mainstream schools, learners with mild and moderate LDs are now encouraged to be incorporated into mainstream schools. These schools will therefore benefit from the implementation of the wide variety of EMs identified in this study. Should schools be unfamiliar with the diverse range of EMs that exist it is suggested that educator training is done in collaboration with occupational therapists available in these schools, taking into account the findings of this study.

6.4 **Future research**

The following recommendations for future research arising from this research study are recommended:

- Investigating the effectiveness of each of the specific EMs.
- Investigating the role of occupational therapists in classroom environments in South Africa.
- Further investigating educators' knowledge and implementation of sensory modifications in the classroom.
- Investigating the implementation of EMs in mainstream schools providing inclusion strategies for learners with LDs.

APPENDIX A -
ETHICAL CLEARANCE CERTIFICATE M10916

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Miss Samantha C Marshall

CLEARANCE CERTIFICATE	**M10916**
PROJECT	Environmental Modifications in Gradte Two Classroom of Learners with Learning Disabilties
INVESTIGATORS	Miss Samantha C Marshall.
DEPARTMENT	Department of Occupational Therapy
DATE CONSIDERED	01/10/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 27/10/2010 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Mrs D Franzsen

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

APPENDIX B -
PERMISSION FROM GAUTENG DEPARTMENT OF EDUCATION D2011/54

Reference No: D2011/54

UMnyango WezeMfundo
Department of Education

Lefapha la Thuto
Departement van Onderwys

Enquiries: Diane Buntting (011) 843 6503

Date:	**15 NOVEMBER 2010**
Name of Researcher:	**MARSHALL SC**
Address of Researcher:	**P.O. Box 941**
	Hartbeespoort
	0216
Telephone Number:	**072 610 3115**
Fax Number:	**N/A**
Email address:	**Sam27marsh@hotmail.com**
Research Topic:	**Environmental Modifications in Grade Two classrooms of learners with learning disabilities**
Number and type of schools:	**FIVE PRIMARY SCHOOLS**
District/s/HO	**EKHURULENI SOUTH; JOHANNESBURG NORTH; JOHANNESBURG WEST; SEDIBENG EAST; GAUTENG EAST**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

Permission has been granted to proceed with the above study subject to the conditions listed below being met, and may be withdrawn should any of these conditions be flouted:

1. ***The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.***
2. ***The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.***
3. ***A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.***

Office of the Chief Director: Information and Knowledge Management
Room 501, 111 Commissioner Street, Johannesburg, 2000 P.O.Box 7710, Johannesburg, 2000
Tel: (011) 355-0809 Fax: (011) 355-0734

4. *A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher must supply the Director: Knowledge Management & Research with one Hard Cover bound and one Ring bound copy of the final, approved research report. The researcher would also provide the said manager with an electronic copy of the research abstract/summary and/or annotation.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

15 November 2010

Shadrack Phele MIRMSA
[Member of the Institute of Risk Management South Africa]
CHIEF EDUCATION SPECIALIST: RESEARCH COORDINATION

The contents of this letter has been read and understood by the researcher.	
Signature of Researcher:	Marshall
Date:	29 November 2010

APPENDIX C -
INFORMATION SHEET FOR PRINCIPALS OF EACH SCHOOL

PERMISSION FOR SCHOOLS

ATT: Principal

_____ **School**

RE: Masters Research Report

Dear Sir/Madam

I am an Occupational Therapy Masters student from the University of Witwatersrand, who is currently investigating environmental modifications in grade two classrooms for learners with learning disabilities in LSEN schools. I would sincerely appreciate the involvement of the teachers at your school and require your permission to carry out the study at your school. I have obtained permission from the Gauteng Department of Basic Education in order to contact your school as well as carry out this study in schools similar to yours.

I am investigating what environmental modifications educators have used or are using in classrooms to improve the performance skills of learners with learning disabilities, as well as the perceived effectiveness of these environmental modifications.

This study aims to create awareness of occupational therapists and educationalists about the environmental modifications used in schools for learners with learning disabilities, as well as identifying perceived effectiveness of these modifications. Consequentially the researcher is hoping to develop a motivational tool for greater implementation of effective environmental modifications to improve the performance skills related to classroom tasks for learners with learning disabilities in Gauteng schools, and possibly South Africa.

If you agree to allow the research to be conducted at your school, I will contact the schools grade two educators, arranging a suitable appointment date and time where I may visit the school. One educator from your school will be selected to participate in the study, based on the inclusion criteria set out for the study. I will explain the purpose, objectives and procedures of the study, as well the subject's rights. The educator will be asked to engage in a one-on–one interview with the researcher. This interview will include a demographic

questionnaire, as well as questions exploring his/her experience with environmental modification strategies in the grade two classroom relating to the use of, availability and perceived effectiveness of these environmental modifications. These interviews will be recorded with the subject's permission. I am also asking permission to take photographs of the empty classroom as well as those environmental modifications visible within the classroom will be taken. The researcher will additionally request a class timetable, as well as a seating plan of the class, relating to specific characteristics of the learners in the class. This should take no longer than one hour.

There are no risks involved in this study where participation is voluntary. The school as well as the subjects may choose to withdraw at any time, without giving reason. Confidentiality will be kept throughout the study, where reference codes will be assigned to educators in order to conceal their identity. All tape recordings will be destroyed after six years or after two years following completion of the research project.

If you have any further questions please feel free to contact the researcher on 072 610 3115 or the WITS Occupational Therapy Department on (011) 717 3701 or the Secretary of the Ethics Committee, Anisa Keshav on (011) 717 1234.

If your school agrees to participate in the study, please read and sign the attached consent form.

Kind regards,

Miss Samantha Marshall

BSc (Occupational Therapy)

APPENDIX D -
SIGNED CONSENT FOR SCHOOL PARTICIPATION AND PERMISSION TO PHOTOGRAPH THE CLASSROOMS

Permission Form

I, _____, principal of _____

_____ give permission for the study investigating environmental modifications in grade two classrooms of learners with learning disabilities to be carried out at this school.

Date: _____ Place: _____

Signature: _____

Permission to photograph classrooms

Reference Code: _____

I, _____ agree to empty classrooms and those environmental modifications visible within the classroom being photographed for the study on environmental modifications in classrooms for learners with learning disabilities.

Signature: _____ Place: _____

Date:_____

APPENDIX E -
PARTICIPANT INFORMATION SHEET

INFORMATION SHEET FOR PARTICIPANTS

Hello,

I am an Occupational Therapy Master's student at the University of Witwatersrand, who is currently investigating environmental modifications in grade two classrooms for learners with learning disabilities in LSEN schools. I am inviting you to participate and would sincerely appreciate your involvement in my study. I have obtained permission from the Gauteng Department of Basic Education as well as your school in order to conduct my study.

I am currently investigating what environmental modifications educators have used or are using in classrooms for learners with learning disabilities, as well as their perceived effectiveness.

This study aims to create awareness of the environmental modifications to improve the performance skills of learners related to tasks in the classroom, used in schools for learners with learning disabilities, as well as identifying perceived effectiveness of these modifications. The researcher is hoping to develop a motivational tool for greater implementation of effective environmental modification within schools for learners with learning disabilities around Gauteng, and possibly South Africa.

If you consent to participating in the study, you will be asked to engage in a one-on–one interview with the researcher. This interview will include a demographic questionnaire, as well as questions exploring your experience with environmental modification strategies in your classroom relating to the use of, availability and perceived effectiveness of these environmental modifications. These interviews will be recorded with your permission. Photographs of the classroom as well as those environmental modifications visible within the classroom will be taken. The researcher will additionally request a class timetable, as well as a seating plan of the class, relating to specific characteristics of the learners in the class. This should take no longer than one hour.

There are no risks involved in this study. Participation is voluntary and you may withdraw at any time, without giving reason. Confidentiality will be kept throughout the study, where

reference codes will be assigned to you and identities will be kept confidential. The researchers will keep the documentation in a locked cupboard in the researcher's office, insuring confidentiality is maintained. All tape recordings will be destroyed after six years or after two years following completion of the research project.

If you have any further questions please feel free to contact the researcher on 072 610 3115 or the WITS Occupational Therapy Department on (011) 717 3701 or the Secretary of the Ethics Committee, Anisa Keshav on (011) 717 1234.

If you agree to participate in the study, please read and sign the attached consent form.

Kind regards,

Miss Samantha Marshall

BSc (Occupational Therapist)

APPENDIX F -
SIGNED CONSENT FOR PARTICIPATION AND PERMISSION TO BE AUDIO TAPED

Informed Consent Form for the Participants

Reference Code: _____

I, _____ agree to take part in the study on environmental modifications in grade two classrooms for learners with learning disabilities as explained in the information sheet above.

Signature: _____ Place: _____

Date: _____

Informed Consent Form for Recording Interviews

Reference Code: _____

I, _____ agree to the interview for the study on environmental modifications in classrooms for learners with learning disabilities being recorded.

Signature: _____ Place: _____

Date: _____

DEMOGRAPHIC QUESTIONNAIRE Code _____

Gender M F Age _____

Teaching Qualifications _____-

_____

_____

Other courses attended: please specify _____

_____

_____

Work Experience

Years of experience in teaching _____

How many years have you taught in a LSEN school solely for learners with learning difficulties _____

How many years experience do you have teaching grade 2's _____

Years at current school_____

School and Learners

Number of learners in the class _____ Gender: M _____ F _____

Age ranges _____

Please indicate what type of difficulties the learners in your class experience where modifications to the classroom environment are necessary (i.e. Concentration difficulties, overly active, behavioural difficulties, motor difficulties, sensory difficulties or specific reading and writing disabilities) _____

_____

_____

INTERVIEW GUIDELINE

1. Welcome interviewee
2. Introduction of researcher and research topic
    - I am here because I would like to understand what modifications are made within the grade 2 classroom environments of learners with learning disabilities. I believe your experiences and opinions will help me to learn more about what modifications have been used and which have been effective to improve the performance of learners with learning disabilities in the classroom.
3. Verbal review of information sheet
4. Allowing time for participant to review information sheet and informed consent form, as well as sign the consent form
5. Investigating environmental modifications in the classroom
    - What is your understanding of environmental modifications that can be used to improve the performance in classroom tasks?
    - Each section on the questionnaire will be discussed as follows
        - What current strategies do you have in place with regards to classroom tasks?
        - Have you found these modifications effective?
        - Have you made use of any other modifications previously? Why do you no longer use them?
        - Do you have the appropriate resources to carry out these specific environmental modifications?

    - <u>Behavioural modifications</u>
        - What specific strategies have you made use of to deal with abnormal behaviours in the classroom?
            - Prompts
                - Disruptive learners
                - Needy learners
                - Uninvolved learners

- Physical modifications
    - Describe the structuring of your classroom and why you have structured it in this way?
        - Prompts
            - Class as a whole
                - Physical structure of specific lessons i.e. story time, written work, discussions
                - Desk arrangement
                - Quiet spaces
                - Visual stimuli
            - Individual structuring of learners
- Sensory modifications
    - Explanation of Sensory integration dysfunction
        - Do you make use of any sensory strategies for learners with sensory difficulties and what are they?
        - Prompts
            - Specialised seating
            - Fidget toys
            - Writing aids
                - Eg. Specialised seating, specific placement in class
- Modifications to the delivery of the curriculum
    - What changes do you make in the way you teach?
        - Prompts
            - Teaching style
            - Presentation of lessons
            - Differing methods
    - What is the routine of the school day?
        - Prompts
            - Lesson lengths
            - Routines
            - Transitions

- Curricular modifications
    - Do you as the teacher make modifications to the curriculum? Can you describe modifications you have made?
        - Prompts
            - Themes
            - Changing method of presentation
            - Time spent on “topic”

6. Conclusion

- Are there any factors that limit the environmental modifications you make use of?
    - Prompts: physical (funding, and actual available equipment etc) and human (expertise and information); and time etc.
- Is there anything else you would like to add? Anything that you have made use of that we have not discussed?

7. Closure

- Thank the participant for his/her participation
- Remind that contact details are on the information sheet, should there be any further questions.

APPENDIX I -
AUDIT TRAIL (EXAMPLES)

Notes on Interview of Participant 001 **Date: 24 November 2010**

I arrived at the school and was very welcomed by all the staff. The school buildings were relatively modern in appearance, were I was taken to a grouping of classrooms around a quad, designated as the foundation phase.

Participant 001 greeted me, and was enthusiastic to begin the interview. As this was my first interview my nerves were relatively high, where a quiver was noticeable in my voice and my questioning was not always very fluent. Participant 001 was however very welcoming and understanding, nodding her acknowledgement throughout the questioning.

The classroom was very welcoming. There was structure and organization, with a variety of learning tools available to the learners. The desks were trapezium shaped and were grouped in different formats depending on the needs of the learners. There were posters on the walls and boards. Different seating options were noticeable immediately once walking into the classroom.

At times I felt that I could bring my view across too much, without coming across as an objective view. For example I would say “without coming across harshly to the learner”. Indicating that shouting at the learner may be a harsh way of handling a problem.

I was so surprised by how much 001 had to offer and how easily and naturally she spoke. She exuberated a lot of passion in her job. She also demonstrated a learning curve in her career, with a complete change of how to handle learners. Only being in the field of learning disabilities for a short while myself, it was extremely interesting to learn a completely different way of dealing with learners’ behavioural difficulties. It really felt like she took time to understand the learner, without becoming impatient and irritable, which can happen so easily.

I did however realize that application and merely talking about handling theoretically are two different things. I also realized how true my study is in researching the participant’s perceived effectiveness, rather than actual effectiveness. That would have to be studied by observing the implementation of the scale, and would be a much more complicated research design. Therefore a limitation to the study.

Unfortunately I forgot to get the participant to complete the demographic questionnaire before beginning with the interview. I therefore interrupted the interview in order to complete the questionnaire. This fortunately did not impact the flow of the interview.

Participant 001 was so eager to show me around the adaptations in her classroom. She was always giving me examples, and demonstrating to me. She had numerous adaptations that I was able to take pictures of.

Notes on Interview of Participant 004 **Date: 10 February 2011**

Luckily I arrived at the right entrance, right by the class I was supposed to be. The participant was inviting and very friendly. She was calm and relaxed in the interview and was eager to participate. She did however struggle to describe what she did in the classroom, as she described it “it was all so natural, and therefore possibly difficult to dissect”.

The school is relatively small. It is located in a residential area with small sized properties. The original school building took up a double property, and since then they have expanded by buying adjacent house/properties. The school is therefore made up of numerous buildings, where old houses have been converted into classrooms. It gives it the school a casual and homey atmosphere. Therefore the school was not specifically built as a remedial school, where rooms in the houses have been modified to make classrooms.

I hadn’t realized before but this grade two class is actually classified as a bridging grade two class by the school. The grade two syllabus is still the foundation for the class, however it can be adjusted and modified for the learner in the bridging class. Despite this the class still matches the criteria for my study.

This current class seemed to be made from a previously existing outhouse building. The floor was therefore made from concrete and the classroom was not specifically designed as a classroom. Space is therefore very limited in the classroom. There wasn’t much carpet space available, and the teacher seemed to have either adapted her teaching to fit the class, or didn’t use carpet time as much and therefore had only a very limited space for carpet time. The desks were initially very large, which she had seemed to request for her learners. The desks therefore took up a lot of space in the classroom.

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