DEVELOPMENT AND VALIDATION OF A BILINGUAL LANGUAGE BATTERY FOR LANGUAGE-BASED LEARNING DISABILITIES

XOLISILE INNOCENTIA MAZIBUKO

9508931

A thesis submitted in fulfilment of the requirements of the degree of Doctorate in Speech- Language Pathology

To the School of Health Sciences,

University of KwaZulu-Natal

Supervisor

Dr Penelope Flack and Dr Jane. D. Kvalsvig

KwaZulu-Natal

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This is complete thesis by Full dissertation.

This is to certify that this is the original work of Mrs. Xolisile Innocentia Mazibuko

As the candidate's supervisors we have approved this thesis for submission

Supervisors:

Signed:

Dr P. Flack…….

Dr J. Kvalsvig…….

Date: …….

ABSTRACT

There are social, linguistic, cultural, and political dimensions that impact on health and education in South Africa. The evolving nature of these dimensions demand the use of language assessment tools that are developed and validated for the South African population. Speech-language assessment informs parents and educators of the nature of speech and language difficulties the learner may have and guides the intervention. IsiZulu is the most widely spoken African language in South Africa. Therefore, development of a tool to assess expressive, receptive, and written language skills of learners with language-based learning disorders in isiZulu, is imperative.

The aim of this study was to develop and validate a tool for language assessment of isiZulu-English speaking learners in grades 1, 2, and 3 who may have language-based learning disabilities. An assessment tool was designed to assess core language skills and identify early indicators of language-based learning disabilities that may result in academic difficulties. The tool development process aimed to construct an innovative test that is linguistically and culturally sensitive to bilingual or isiZulu-English speakers while the content is rich for identifying indicators of language-based learning disability. Elements in expressive and receptive language, phonological awareness, listening, reading, and mathematically-based language concepts were considered.

The conceptual tool development phase involved a systematic literature review, pretesting with two existing tools and consultation of a five member Delphi review panel for advice and reviews. Field trials contributed to the development of test items and procedures and tested the tool's application in mainstream and remedial schools as well as rural and urban communities of learners in KwaZulu-Natal. A combination of qualitative and quantitative methods were used to collect and analyse data. The results indicated that the new tool was linguistically and culturally appropriate. The majority of the subtests provided good reliability and valid results. The study makes a worthy contribution to the body of knowledge in the field of speech-language therapy and basic education. The results and guidelines from this study set out the basic elements required for development of language assessment tools in other African languages. The development of the assessment tool will yield standardization of a bilingual language assessment tool in South Africa.

DECLARATION –PLAGIARISM

I, **Xolisile Innocentia Mazibuko** Declare that:

1. The research reported in this thesis, except where otherwise indicated, is my original work.
2. The thesis has not been submitted for any degree or examination at another University.
3. This thesis does not contain other person's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
4. This thesis does not contain other person's writing, unless specifically acknowledged as being sourced from other researchers. Where other resources have been quoted then:
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A contribution to publications that form part or include research presented in this thesis is stated below.

Signed……

DECLARATION- LIST OF PUBLICATIONS

CONFERENCES

1. Mazibuko X. Annual South African Speech-Language Hearing Association- ENT conference, 8-10 October, 2016. Johannesburg International Convention Centre, Gauteng.

Contribution:

Mazibuko X. Prepared the presentation and delivered it at the conference

P. Flack: edited the presentation

J. Kvalsvig: edited the content

DEDICATION

This work is dedicated to the English additional language learners in South Africa.

This work is also dedicated to my children Vuyiswa, Andiswa and Andile who have always been my research subjects.

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GLOSSARY

Assessment	A formal attempt to determine the learner's status with respect to educational variables of interest.
Assessment tool	A variety of activities and procedures intended to ensure a comprehensive set of data for determining an individual's status and needs (National Joint Committee on Learning Disabilities, 1994).
Auditory Processing Disorder	A disorder that can cause difficulty in distinguishing the difference between similar sounds. It can occur without any hearing disorder rather they affect how the brain perceives and processes what it hears (National Center for Learning Disabilities, 2013, p. 4).
Bilingualism	Ability to speak and understand two languages (Royal College of Speech and Language Therapists, 2007).
Bilingual Speaker	A person who is bilingual has the ability to communicate in more than one language and can be thought of as a continuum of language skills in which proficiency in any of the languages used may fluctuate over time and across social settings, conversational partners, and topics, among other variables (Gottardo & Grant, 2008, p. 1).
Clinical language assessment	A comprehensive assessment must include procedures to determine levels of performance in the following domains: motor, sensory, cognitive, communication, and behaviour. When a learning disability is suspected, the following areas should be assessed: listening, speaking, reading, writing, reasoning, mathematics, and social skills. However, the assessment must focus on the presenting problem(s) and possible correlate(s) (National Joint Committee on Learning Disabilities, 1994).
Culture	Culture is the learned, shared and transmitted knowledge of values, beliefs and lifeways of a particular group that are generally transmitted inter-generationally and influence thinking, decisions and actions in the patterned or in certain ways (Battle, 2000, p. 2).
Cultural competency/ sensitivity	A stage of "acceptance and respect for difference, continuing self-assessment regarding culture, careful attention to the dynamics of difference, continuous expansion of cultural knowledge and resources and a variety of adaptations to service models" (Battle, 2000, p. 19)
Dyscalculia	A wide range of lifelong learning disabilities involving mathematics

	(National Center for learning disabilities, 2013, p. 2)
Dyslexia	A language-based processing disorder that can hinder reading, writing, spelling and verbal communication (National Center for Learning Disabilities, 2013, p. 1).
Dysgraphia	A learning disability that affects writing which requires a complex set of motor and information processing skills (National Center for Learning Disabilities, 2013, p. 2).
Indicators of LD	A range of environmental, biological, genetic, and perinatal conditions may be associated with adverse developmental outcomes (Shonkoff and Phillips, 2000, p. 124) and may be risk indicators (*i.e.* warning signs) for learning disabilities (American Speech-Language Hearing Association, 2007, p. 2).
Language	Expressive and receptive communication skills including the ability to speak, listen, read and write.
Language-based learning disability	Language-based learning disabilities are defined as problems with age-appropriate reading, spelling, and writing. Language-based learning disabilities are a subgroup of LD that are rooted in deficiencies pertaining to the acquisition of spoken and written language. (American Speech-Language Hearing Association, 2015, p. 1).
Learning	Learning involves acquiring and modifying knowledge, skills, strategies, beliefs, attitudes and behaviours (Schunk, 2012).
Learning disorder	Learning Disorder is history or current presentation of persistent difficulties in the acquisition of reading, writing, arithmetic or mathematical reasoning skills during the formal years of school (Montague & Cavandish, 2013, p. 3).
LLD indicators	Early warning signs of the presence of language based Learning disabilities.
Linguistic competency/ sensitivity	Culture and linguistics refer to integrated patterns of human behaviour that include language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or other groups (for example, gender, gender identity or gender expression, age, national origin, sexual orientation, disability). Cultural and linguistic competence is a set of congruent behaviours, attitudes, and policies that come together in

a system, agency, or among professionals that enables effective work in cross-cultural situations (Battle, 2000, p. 20).

LIST OF ABBREVIATIONS

ADHD: Attention Deficit Hyper-activity Disorder

ANA: Annual National Assessments

APA: American Psychiatry Association

ASHA: American Speech-Language Hearing Association

BBL-BLD: Bilingual Battery for Language-based Learning disability

BN: Backward Naming

CAPS: Curriculum Assessment Policy Statements

CELF: Clinical Evaluation of Language Fundamentals

CHC: Cattell-Horn-Caroll

DBE: Department of Basic Education

DoE: Department of Education

ESL: English Second Language

FE: Following directions in English

FZ: Following directions in isiZulu

ESL: English Second Language

IDEA: Individuals with Disability Education Act

IQ: Intelligence Quotient

GHS General Household Survey

HPCSA: Health Professions Council of South Africa

HOD: Head of Department

KZN: KwaZulu-Natal

L1: First Language

L2: Second Language

L-b LD: Language- based learning disability

LD: Learning Disability

LLD: Language Learning Disability

LoLT: Language of learning and teaching

NJCLD: National Joint Committee on Learning Disabilities

PA: Phonological Awareness

PANSLAB: Pan South African Language Board

PRAESA: Project for the study of Alternative Education in South Africa

RAN: Rapid automated naming

RCSLT: Royal College of Speech and Language Therapists

RL: Repeating Letters

RN: Repeating Numbers

RW: Repeating Words

SAJCD: South African Journal of Communication Disorders

SASHLA: South African Speech-Language Hearing Association

SLD: Specific Learning Disorders

SLTs: Speech- language Therapists

SSD: Speech Sound Disorders

SZ: Story Comprehension isiZulu

UK: United Kingdom

UNESCO: National Organisation for Education, Science and Culture

USA: United States of America

WM: Working Memory

WS: Word Association

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter introduces the concepts of learning disability and language-based learning disabilities, emphasises the links between clinical and educational language assessment and, presents the problem statement, research aim and objectives. South Africa is a linguistically diverse country with eleven official languages. Historically, there were two official languages: English and Afrikaans, until democracy became a reality in 1994. Many South Africans speak more than one language (Statistics South Africa, 2011). However, education in urban areas and at tertiary education institutions continues to be conducted in two specific languages, English and Afrikaans. This means that most students receive their education and training in a language that is not their first language (Statistics South Africa, 2011). At tertiary institutions speech-language therapists (SLTs) are trained using language tools that are mainly developed in the United Kingdom (UK) and the United States of America (USA).

Imported tools are used in practices, both in the private and public sectors. SLTs are required to participate in a year of community service on completion of their degrees, which takes place in public hospitals across the country. It is during this time that the importance of having access to culturally and linguistically relevant assessment tools becomes evident, as they work with children and adults who have compromised communication abilities and are not first language users of English. This highlights the need for a relevant, bilingual assessment tool for South African learners whose first language is an African language such as isiZulu. In the absence of such a tool, it is difficult to effectively identify language-based learning disability (L-b LD).

1.2 Background

During the years of apartheid (1948 to 1994) English and Afrikaans were the official languages in South Africa. African language speakers were obliged to learn these languages in order to work in the public sector and to study in tertiary institutions. Bilingualism and multilingualism naturally developed amongst speakers in mining and urban societies (Alexander, 2005, p. 2). The constitution adopted by the Constitutional Assembly in 1996

promoted the acceptance and development of all African languages used in South Africa. The establishment of the Pan South Africa Language Board (PANSLAB) further promoted the development and use of 12 official languages. Through the social evolution in the past 20 years, multilingualism has been growing in South Africa.

English is still the commonly used language in official documents, commercial communication and in public policies. However, it is statistically the 4th most spoken home language in South Africa (Statistics South Africa, September 2014). IsiZulu is the language of the Zulu people in South Africa with about 11.6 million speakers, the vast majority (over 78%) of whom live in KwaZulu-Natal (KZN) province (Statistics South Africa, September 2014). According to the Census 2011, isiZulu is the mother tongue of 22.7% of South Africa's population, followed by isiXhosa at 16%, Afrikaans at 13.5%, English at 9.6%, Setswana at 8% and Sesotho at 7.6% (Statistics South Africa, September 2014). The remaining official languages are spoken at home by less than 5% of the population for each language group. Although isiZulu is a regional language with most speakers in KwaZulu-Natal, more than 18% of isiZulu speakers are found in Gauteng and 7.6% in Mpumalanga. IsiZulu is also represented in other provinces. IsiZulu is the second most widely spoken language after Shona in Sub-Saharan Africa. It forms part of the Nguni language group and has similarities in terms of syntax and grammar to the other major languages in this group, namely isiXhosa, isiSwati and isiNdebele.

1.3 Language and Literacy

Literacy can simply be defined as the ability to read, write, speak, compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, to develop one's knowledge and potential (American Speech-Language Hearing Association, 2002, p. 168). The South African Department of Basic Education defines literacy in a similar way in the Annual National Assessment guiding documents, adding that literacy is *"the ability to read for knowledge, write logically, communicate verbally and think critically about printed material"* (Department of Basic Education, 2014, p. 1).

The Annual National Assessment (ANA) results for 2011 revealed that grade 3 learners achieved an average score of 35% in literacy. A similar figure (36%) was reported in 2007 indicating no improvement in the literacy levels and signalling a crisis for the public education system as reading and writing skills are foundational to all learning (Department of

Basic Education, 2014). There is a link established between low literacy scores obtained consistently in the ANA since 2011, and poor language skills in general as reflected in the Annual National Assessment 2014 report. In this report, a relationship is established between poor performance in math and level of the home or additional language skills. The report states that learners are *"unfamiliar with the math terminology"* and they *"do not know how to solve problems"* suggesting that general language skills in the language of learning and teaching (English) are weak. Regarding home language scores, the report states the common problems are "*learners struggle to respond to questions that require use of their own words"; "learners are unable to interpret a sentence or give an opinion when required*"; and "*learners lack the required editing skills when writing*" (Department of Basic Education, 2014, p. 11). The poor performance in home language suggests that language skills are generally weak.

The nature of literacy includes spoken-written language relationships since reading and writing are acts of communication and tools of learning. Therefore, literacy learning depends on a strong foundation of verbal language skills (Walsh , 2009, p. 67). Low language ability results in high risks for literacy difficulties (Nelson, 2006, p. 4). Therefore, SLTs have a role to play in providing services that directly improve literacy, facilitate bilingual language learning and remediation when language-based learning disorders prevail. The Language in Education Policy referred to section 3(4) (M) of the National Education Policy Act of 1996 guides the national plan for use of official languages and promotes additive bilingualism in South Africa (Department of Education, 2008). The Language in Education Policy (1997) should be implemented by language professionals including SLTs and educators. Therefore, SLTs need to be aware that clinical knowledge alone is not adequate. They need to acknowledge the political influence and ideology in literacy policy and practice (Walsh, 2009, p. 69).

Such political controversy is highlighted by recent South African research that suggested that the underachievement in literacy is linked to instruction and assessment of learners in English (Jordaan, 2011, p. 79; Kallenbach, 2007). This research established that SLTs need to provide intervention programs for learners with L-b LD, provide clinical activities that facilitate literacy and assist ESL learners. It is supported by a general requirement that adequate data are necessary before any decision regarding language intervention can be taken (Walsh, 2010, p. 211). A lack of relevant data about L-b LD in South Africa and the rest of the continent is a

challenge in meeting this requirement. It appears that many research efforts in language development in the Sub-Saharan region have not been applicable to therapeutic settings due to their focus on linguistic theory (Alcock & Alibhai, 2013, p. 156). There is limited data regarding bilingualism and language differences in Southern Africa despite the global data that indicates the impact of using adequately adapted and culturally appropriate test instruments (Alcock & Alibhai, 2013, p. 156). Speech-language therapists have a responsibility to contribute towards collection of data relating to different learning disabilities (Kathard, et al., 2011, p. 67). Hence, the necessity of projects such as this one which address the development of culturally and linguistically appropriate language assessment tools for the South African population.

1.4 Multilingualism and Language of Learning

Language as a barrier to learning is a critical area of discussion and has been an interest of research in South Africa since racial integration of classes in 1992 (Uys, van der Walt, van der Berg, & Botha, 2007, p. 70). English became the preferred choice for first additional language by the majority of the learners in schools because English in South Africa is generally regarded as an international language and some regarded English as the *"language of liberation"* whereas Afrikaans was considered the *"language of oppression"* (Broeder, Extra, & Maartens, 2002, p. 71). There has been consistent increase in the number of learners using English as a language of teaching and learning (LoLT) instead of their home language.

The KwaZulu-Natal (KZN) Department of Basic Education's Annual Report indicated that between 1996 and 2008 the number of isiZulu speaking learners enrolled in English medium public schools increased annually, while Afrikaans speaking learners diminished (Department of Education KwaZulu-Natal, 2008). According to the KZN Department of Basic Education Annual Report 2011-2012, English is most often used as a language of teaching and learning in South Africa (Department of Basic Education, 2012b). Research further indicates that lack of proficiency in the language of instruction and assessment undoubtedly contributes to poor performance of African children in the assessment of math and science (Zuma & Dempster, 2008, p. 32).

Speech-language therapists and educators have been concerned about the role of bilingualism in literacy and assumptions have been made about use of English as LOLT as the cause for poor performance and poor literacy in ESL learners (O'Connor & Geiger, 2009; Kathard

et.al, 2011). Many educators believe that multilingualism, has a negative impact on performance for learners who use English as a second language in South Africa (Navsaria, Pascoe, & Kathard, 2011, p. 96; Govender, 2009, p. 6). Henceforth, definition of the terms monolingual, bilingual and multilingualism needs to be clarified as they are key terms for language therapy in the South African context and in this research. A monolingual speaker is defined as an individual who uses one language and is proficient in many varieties of this language, using different registers and of switching between varieties and registers in the appropriate context (Kemp, 2009, p. 15). A bilingual speaker is described as a person who uses two languages but may not have equal levels of competency (Saville-Troike, 2006, p. 3). A multilingual speaker is a user of three or more languages however some definitions of multilingualism refer to a multilingual as a user of more than one language (Saville-Troike, 2006, p. 3). A multilingual speaker is then a person who has the ability to use three or more languages either separately or in various degrees of code mixing.

Literature has established that multilingualism impacts on the child's cognitive development and information processing ability in a positive way (Bialystok, Luk, & Kwan, 2005, p. 61). It also has revealed that cognitive processing has been shown to affect reading and spelling development in a reciprocal manner (De Sousa, Greenop, & Fry, 2011, p. 517). Likewise, there are advantages in using the home language for learning and for reading. South African research has demonstrated that English Second Language (ESL) children who learn reading skills in their home language are able to transfer skills easily when learning to read in another language (Morrow, Jordaan, & Fridjhon, 2005, p. 169). Their study reflected that it is not just language proficiency in the first language (L1) or the second language (L2) that contributes to poor school performance but socio-economic issues and the quality of education which may also interact with language proficiency (Morrow *et al.*, 2005, p.169). Therefore, a combination of social, linguistic and cultural factors influence the performance and progress of ESL learners in schools.

Additional or second language speakers of English are exposed to more than one other language at home or in their communities but are not necessarily fluent in these languages, failing to meet the strict use of the term multilingual speakers (Jordan & Levine, 2009, p. 79). This discrepancy challenges educators to decide which language to use for communication in the classroom, which one to treat as a first language in the classroom and which one to develop further or ignore. The South African SLTs are challenged by how to identify relevant

language abilities in school aged children who are ESL speakers who present with language-based learning disabilities (Naude', Louwe, & Weideman, 2007, p. 519). The SLTs are also challenged about the choice of language for intervention and therapy in order to impact on literacy if the student is not using their home language as LoLT (Naude', Louwe, & Weideman, 2007, p. 519).

The terms first and second language are used in this study and are represented by the abbreviations L1 and L2. This is also because the South African education system uses the terms: first, second or additional languages to indicate the order of languages used in schools. The learner's primary language is referred to as a home language while the school's elected language of education and teaching (LoLT) is often referred to as the first language. The first language is used in class by the teacher and in learning materials (Department of Basic Education, 2012). The second or additional language is often used to refer to the learner's second language chosen as a subject (Department of Basic Education, 2012). The learner whose home language is isiZulu but uses English as LoLT is often referred to as English second language learner. Due to the varying degree of proficiency in both English and the home language, this study prefers the term IsiZulu-English speaking learner to refer to ESL whose home language is isiZulu; learners who may not be fully bilingual and to multilingual learners who may also be using isiZulu and English .

1.5 Learning Disabilities in South Africa

When an isiZulu-English speaking learner faces difficulties in the classroom, it is critical to distinguish which type of language impairment they could have. Firstly, it could be due to language differences which is differences expressed in semantic structure, speech sound production, vocabulary and pragmatics between the first and second languages (De Lamo White & Jin, 2011, p. 615). Secondly, it could be a specific language impairment which is a significant deficit in language ability, affecting first language, which cannot be attributed to hearing loss, low non-verbal intelligence or neurological damage (Leornard, 2014, p. 3). Thirdly, it could be a specific learning disability which is a group of disorders in listening, speaking, reading, writing and mathematics (American Speech-Language Hearing Association, 2015). This could be one of the scenarios where the learner is referred to SLTs for diagnostic differentiation. Thus, it is critical to evaluate the linguistic factors that contribute to poor academic performance, particularly in literacy. Despite this challenge, the

relevance of speech and language assessment is underestimated within the education sector in South Africa due to neglect of the connection between language processing and learning. Using a conceptually correct definition of language-based learning disability certainly assists in differential assessment between learners with barriers to learning or special needs and those with specific language-based learning disabilities.

There is an estimation that at least 8% of African students have learning difficulties (Abosi, 2007, p. 196). The compounding issues in Africa are poverty, health issues, overcrowded classrooms, shortage of experienced teachers, lack of teaching material and motivational issues. A study conducted in the Butere district of Kenya indicated that at least 24% of the grade 3 children in the study had learning disabilities (Wekesa, Poipoi, Wanyama, & Nyakwara, 2012, p. 390). The study found that the term learning disability is used as a catch all label for children who are not meeting the scholastic expectations. There is an observation indigenous Africans view learning disability as a western concept (Abosi, 2007). Furthermore communities, in general and parents specifically, do not understand learning disabilities and often treat these learners in negative ways due to religious, cultural beliefs and lack of knowledge about disabilities (Tederera & Hall, 2017). The nature and specificity of the learning difficulties observed and also merits further research in the African continent.

The prevalence of L-b LD in South Africa is unknown as the country lacks a nationally accepted tool to measure the prevalence of disability (Nel & Grosser, 2016, p. 84). The report on the Profile of Persons with Disabilities provides statistics of non-specified physical and cognitive disabilities from which researchers make deductions about L-b LD (Statistics South Africa, September 2014). The questionnaire of the statistical report enquired about "*children with cognitive difficulties including remembering and concentration"* This was reported to be 4.2% (Statistics South Africa, September 2014).

The General Household Survey: Focus on Schooling Report, provides the most recent figures regarding the status of education and literacy among the children in South Africa (Statistics South Africa, 2011b). According to the GHS report, in the year 2011, 8% of the children who left school cited "*unable to perform"* as the reason for their leaving and 3.1% cited disability as the cause. Furthermore, 10% of all school-going children were repeating a grade in 2011, with the majority of them repeating a grade in high school, followed by grade one repeaters (Statistics South Africa, 2011b). Limitation in data regarding disabilities in the GHS Focus

on Schooling Report-2011 lead to an estimation of non-specific learning disabilities to be between 20 and 30 % of school going children (Statistics South Africa, 2011b). The combination of information from the literacy and disability statistics has been used to estimate L-b LD in South Africa. This leads to a conclusion that South Africa has a significant number of students who are performing below expected academic standards.

1.6 Formal Language Assessment Tools

Assessment of language, learning and reading abilities is important since it provides crucial information about the child's cognitive development and capabilities (Pretorius, Hansen, Smit, Joubert, Mostert & Adinolfi, 2009, p. 52). Identification of language-based learning disabilities is often subjective affected by the perception of the educator, parents, or other team members. Clinical language assessment sets the standard for the child's development and allows for comparability of results for one child among other children in a similar context. Formal language assessment contributes to the determination of the child's reading potential, cognitive processes that underlie scholastic performance, and is often used as a measure of the child's literacy development outcomes (Westerveld, 2011, p. 63). Spoken and written language skills must be assessed in order to gain a complete picture of children in the school going age and influence teaching methods. Therefore, clinical language assessment must be informed by learning theories (Westerveld, 2011).

The use of international formal assessment measures in clinical settings has been criticized for their lack of sensitivity, validity and cultural appropriateness (Solarsh & Alant, 2005; Bortz 2012; Jordaan, 2011). For clinical practice, irrelevant assessment results are the consequence of using culturally and linguistically inappropriate assessment tools (Maine, 2010). In culturally and linguistically diverse communities like South Africa, assessment procedures become more complex and require culturally competent clinicians (De Lamo White & Jin, 2011, p. 613). If the reliability and validity of the language test is questionable, it may result in misdiagnosis of bilingual children and irrelevant therapeutic practice. The influence of English on isiZulu goes beyond lexical borrowings but creates ethnolinguistic boundaries between people which also affects culture and lifestyle amongst isiZulu speaking households (Rudwick, 2008, p. 101). Thus suitable and language specific assessment tools must be developed and based on scientific research.

The number of language tools that have been adapted or developed in South Africa does not meet the demand for assessing different languages. Published tools include the *Toets vir Mondelinge Taal Produksie* (Vorster, 1980); Auditory comprehension of language (Leggo, 1992), the ZERLA (Bortz, 1995), the seSotho Adaptation of the Peabody Picture Vocabulary Test (Pakerndorf & Alant, 1997) and the Test of Ability to Explain-Zulu Culture (Solarsh & Alant, 2005). The need to develop clinical language tests in all 12 South African languages, including sign language, is overwhelming. The need for such tools is not just necessary for children with learning disabilities but for academic placement in higher education institutions, standardised literacy assessments for adults, workplace evaluations, South African sign language literacy assessments and for national language assessment purposes, to name a few (Koch, 2007; Jordaan, 2011).

Assessing learners in their first language enables extraction of the learners' ability from the contextual issues that might be affecting the learner (Solarsh & Alant, 2005, p. 42). The best practice for SLTs suggests that the clinician should assess, in English and the home language (Royal College of Speech and Language Therapists, 2007). Assessment should measure the student's responsiveness to a well-designed instrument and customise a remediation program in the student's own language (Paradis, Schneider, & Duncan, 2013, p. 2). For isiZulu-English speakers, like other bilingual learners with or without typical language development, priority should be given to assessing both languages (Bedore & Peña, 2008). This addresses the challenge of interaction of different languages, limited relational experiences and dialectal features that could be inappropriately categorised as errors if examiners are not sensitive to the potential for bias (Bedore & Peña, 2008).

1.7 Problem Statement

There are inadequate methods and language tools for South African SLTs to assess learners with language-based learning disabilities. Available language assessment tools are inadequate for the language needs, diverse cultural contexts, and do not accommodate environmental and educational differences in rural and urban contexts. Furthermore, dialectal differences, socio-economic factors and literacy challenges have not been addressed by existing adapted tools. Compounding factors to the lack of assessment tools in South Africa are the shortage of relevant human and financial resources. Therefore, in order to address the demand for SLT services in schools, appropriate language assessment tools needs to be designed. The

language tool should address the realistic challenges that teachers are facing in bilingual classrooms and assist with differentiation of language difficulties.

1.8 Research Question

How can a linguistically and culturally appropriate language assessment tool be developed and validated to detect and evaluate early indicators of language-based learning disorders in grade 1, 2 and 3 isiZulu-English speaking learners?

1.9 Aim and Objectives

1.9.1 Research Aim

The aim of the study was to develop and validate a sensitive, linguistically and culturally appropriate assessment tool to detect and evaluate language learning disorders in grade 1, 2 and 3, isiZulu-English speaking learners.

1.9.2 Research Objectives

a) To identify the components of existing tools that could be culturally appropriate for isiZulu-English speaking learners by using systematic literature review;
b) To identify early indicators of L-b LD and evaluate their relevance and application to isiZulu-English speaking learners by conducting pre-pilot studies using existing tools;
c) To develop culturally appropriate and linguistically competent test components (items) using the Delphi procedure;
d) To develop a bilingual (isiZulu and English) language assessment tool that is linguistically, culturally and theoretically sensitive using cyclical testing of the tool in development ;
e) To evaluate the tool for cultural and linguistic appropriateness for children through field trials;
f) To validate the linguistic, administrative and content elements of the assessment tool;
g) To determine the reliability of the diagnostic tool amongst learners in grade 1, 2 and 3 through statistical analysis.

1.10 Study Type and Method

The study adopted a mixed methods approach using both quantitative and qualitative approaches. The study methods adopted were both descriptive and quasi experimental. Triangulation methods were used in the development of the assessment tool. The study occurred in three main phases namely: pre-testing and determination of L-b LD indicators in phase one; tool design and tool development in phase two and validation in phase three. The first phase of the study adopted a qualitative approach using descriptive strategy which allowed for profiling of L-b LD indicators. The second phase involved quasi-experiments through trials and modifications of the tool content, structure, language and cultural components. Quantitative analysis of the results for validity and reliability occurred in phase three.

1.11 Outline of Study

Chapter 1 introduces learning disability in the South African context and determines the rationale for the study.

Chapter 2 provides an extended overview of definitions and explanation of concepts related to language-based learning disability.

Chapter 3 offers a theoretical framework for tool development and the study.

Chapter 4 stipulates details of the research methodology. Sampling and data collection methods used in each phase are described. Ethical considerations and benefits of the study are clarified.

Chapter 5, 6 and 7 report on the qualitative and quantitative results of each phase of the study.

Chapter 8 discusses findings and provide evidence from available literature to support or challenge the current findings. The developed tool is evaluated and applied.

Chapter 9 summarizes the findings, highlights insights from the tool development process and concludes by raising the relevant problems. The challenges and recommendations for future studies are made.

1.12 Conclusion

Language assessment of isiZulu-English learners is critical for identification of language-based learning disabilities. There is a lack of appropriate language assessment tools for language-based learning disabilities. This study sought to develop a culturally and linguistically appropriate language tool for isiZulu-English learners in the foundation phase.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature relevant to specific learning disabilities using the preferred term language-based learning disability (L-b LD). Initially, a comparative analysis of clinical and educational perspectives to specific learning disability is made and a global review of relevant definitions is provided. In this review, the importance of conceptual and operational definitions are acknowledged. The position taken in this review is that the use of operational definitions by the departments of health and education in South Africa is not based on conceptual foundations and leads to confusion of the concept of learning disabilities. A systems approach is adopted in discussing variables that affect a bilingual isiZulu-English learner with L-b LD. Using this approach, microsystems such as neuro-psycho-social indicators, educational system, language, isiZulu culture and speech-language or communication pathology are discussed. Recent research on the early indicators of L-b LD is discussed and applied to formulate profiles of expectations for learners with L-b LD. Considerations for factors unique to isiZulu language and culture follows thereby laying the foundation for appropriate language assessment in this study.

2.2 Global views of Language-based Learning Disability

The challenge to intervention for learners with specific learning difficulties in inclusive schools begins with the inconsistent usage and definition of the generic term learning disability (LD). Often the terms specific LD, language LD, dyslexia and learning disabilities are used interchangeably by professionals and parents. The definitions and the concepts describing specific LD have also evolved over the years bearing philosophies from different schools of thought regarding theories of learning and intervention approaches. Learning disability refers to different conditions in different countries for example, the United States of America (USA) versus the United Kingdom (UK) and the Republic of South Africa (RSA) as well as for different professionals for example, psychologists versus speech-language therapists (SLTs).

The authoritative definition of learning disabilities adopted by the federal regulations prepared by the US Office of Education considers learning disability to mean "*a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken, or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations*" (United States Office of Education, 1977). Although the understanding of the condition has changed over the past forty years, this definition has become the basis on which schools identify specific learning disabilities in the USA. It has become an operationally accepted definition and guides practice at school level to be in line with educational policies such as the Individual with Disabilities Education Act (IDEA) and No Child Left Behind programme (Harowitz, Rawe, & Wittaker, 2017). The term specific learning disabilities includes conditions such as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. It does not include learning problems which are primarily a result of visual, hearing, motor, cognitive, emotional, environmental or economic disadvantage (Harowitz, Rawe, & Wittaker, 2017). Guatemala, Spain and Taiwan are among the countries that have adopted the same definition of LD and have also adopted the subsequent legislative mandates of the United States (Sideridis, 2007). The prevalence of L-b LD and attention in the USA is estimated to 1 in 5 children of school aged children and estimated 12.2% of the general student population (Harowitz, Rawe, & Wittaker, 2017).

In England, the term learning disability was introduced to replace the term mental handicap and reflects the presence of impaired intelligence and impaired social functioning. According to the British 2001 White Paper on Health and Social Care of People with Learning Disabilities, the term learning disability includes "*the presence of a significantly reduced ability to understand new or complex information, to learn new skills, with a reduced ability to cope independently which started before adulthood with a lasting effect on development*" (Emerson & Heslop, 2010). The UK Department of Health makes reference to learners with primary or secondary special educational needs associated with mild, moderate, severe and profound learning disabilities (Emerson & Hatton, 2008). In the context of health services in the UK, learning disabilities refer to intellectual disability of varying degrees. However, in the education sector, learning difficulty is associated with people with specific learning difficulties who do not have a general impairment in intelligence (Emerson & Heslop, 2010) Thus, in the UK, children with reading and spelling difficulties such as dyslexia are not regarded as having a learning disability but a specific learning disability. It is important to

note that these terms are often used interchangeably in the education sector even though they mean different conditions. The prevalence of specific mathematical difficulties was estimated at 2.3% and reading disorders at 3.9% in the United Kingdom (UK). The total estimation of school age children with severe learning disabilities was 7.8% in the UK (Alborz, McNally, & Genniding, 2010, p. 351).

Tracing the definitions of LD in Australia reveals that the inconsistent use of terminology has also been a challenge resulting in the use of varying terms and meanings for the terms such as learning disability, learning difficulty and specific learning disabilities. The term learning disability is associated with impairment of intellectual functions with limitations in a range of daily activities and with restrictions in participation in various life areas (Australian Institute of Health and Welfare, 2004). Nevertheless, adoptions of different terms in different parts of the country continues to prevail. The Government of South Australia describes LD as experiencing difficulties with learning for learners with average and above average intelligence while the Western Australian Government referred to ongoing persistent learning difficulties including dyslexia, dyscalculia and ADHD (Lund, 2013). The Western Australian Government also utilises the term specific learning disability to refer to learners with a barrier to effective learning, sharing the same understanding as the USA. It uses specific learning disability to refer to learners who struggle to meet the academic expectations and include all learners and adults who have limitations in learning arising from constitutional impairments (Lund, 2013).

The Australian Taskforce on students with Learning Disabilities clarified that learners with specific learning disability do not have reduced cognitive capacity. Furthermore, the learning barrier is viewed as a component of the learner's developmental delay or impairment, as such, intelligence quotients (IQ) testing are used to differentiate learners who have a specific learning disability (SLD) from those who do not. Thus, learners with SLD are expected to have at least an average IQ, show potential or excel in another academic area including sports and artistic achievement. Learners with SLD are then recommended for remediation or accommodated as they would have difficulty accessing the curriculum. The Taskforce on Students with Learning Disabilities concluded that learning difficulties are multi-faceted and multi-dimensional.

In the People's Republic of China the term special learning disability is used and it includes dyslexia, a disorder of reading and spelling. The terms dyslexia and special LD are used interchangeably in China. The incidence of special learning disability is thought to be around 10% of the population of China (Chan, 2008:196; Yao & Wu, 2003:392). From a Chinese perspective, mild forms of dyslexia are often perceived as a maturational lag, lack of discipline and lack of motivation (Chan, 2008). Recent breakthroughs in addressing the issue of special learning disability in China has come as a result of improved understanding of the Chinese languages and the recognition that learning disability and dyslexia can occur in an orthographically different system such as Cantonese or Mandarin, which was previously disputed. What transpires from the research in China is that the orthography or the nature of written symbols of a language does not absolve it from learning disabilities (Chan, 2008). Learning disabilities are now perceived to have a common basis with the alphabet language system such as English (Chan, 2008). Recent policy changes in China have allowed for recognition of special learning disability as a disability which promotes educational inclusion for learners with the condition. The global view of the definition of specific LD reflects that many countries have adopted the NJCLD definition as a core guideline (Sideridis, 2007). However, countries like Botswana, South Korea and Israel have also come up with their own models of assessing and intervening for learners with specific LD. The different economic, cultural and linguistic characteristics within each country inhibit the creation of a standard criteria for detection of specific LD.

2.2.1 Learning Disabilities in South Africa

The South African Department of Education (DoE), in the policy document White Paper 6 on Special Needs Education, used the term "*learners with special needs"* to refer to learners in special schools and the term "*learner who experiences barriers to learning*" to refer to learners with specific learning difficulties and developmental disabilities (Department of Education, 2001:18). The White Paper 6 definitions reflects a transition from the medical model to a socio-ecological model of health services in South Africa which occurred at a time of political transition in South Africa (Nel & Grosser, 2016).

Defining learning disabilities in South Africa is multidimensional as it incorporates intrinsic and extrinsic barriers to learning. The intrinsic barriers to learning and development further incorporates a wide range of disabilities including physical, visual, hearing and psychological barriers (Department of Education, 2005). Academic difficulties experienced due to various

extrinsic factors such as physical, environmental and contextual disadvantages are also referred to as barriers to learning (Department of Education, 2001:18). The terminology of barriers to learning reflects sensitivity towards people with disabilities, promotes inclusivity and an acknowledgement that specific LD is an academic disorder. On the contrary, such terminology is extremely broad and confusing as the term does not distinguish between specific LD and other disabilities associated with social, cognitive or contextual factors related to education and policies (Scanlon, 2013, p. 27).

In South Africa intrinsic and extrinsic factors interplay in the manifestation of specific learning disabilities (Nel & Grosser, 2016 p. 84). There is a strong evidence that cognitive and intellectual abilities also form part of the group of medical barriers that can affect learning, reasoning, problem solving and memory negatively (Jooste & Jooste, 2011). There is an equally strong sense that socio-economic factors such as poverty, illiterate parents, nutritional issues, crime amongst others have harmful effects on the physical and socio-emotional wellbeing of the child (Geldenhuys & Wever, 2013). Since the support structures are not functioning well yet in many schools, there is also discrepancy in assessment and rehabilitation of learners with L-b LD (Nel & Grosser, 2016, p. 87). The 2008 policy, the Screening Identification Assessment and Support, support programmes for students with L-b LD was designed in such a way that the learner gains full access to all learning activities and there must be collaboration between all role players. However, there is poor integration of services between schools and therapeutic services as teachers (and allied health workers) struggle to translate policies into practice (Engelbrecht, Nel, Nel & Tlale, 2015, p. 1).

Therefore, defining and conceptualising L-b LD in South Africa is complex. The definitions used in official government documents in the department of education differ from the conceptual definitions used by Speech–language Pathologists. Due to the flexibility in the use of terms and definitions amongst health and education professionals, there is uncertainty about the nature of L-b LD in South Africa. However, it is generally believed that learning difficulties arise from extrinsic factors while learning disabilities are a result of intrinsic factors and may persist despite ideal learning conditions and support (Dunbar-Krige & Merwe, 2010).

2.2.2 Conceptual Definitions

The challenge with defining specific LD is leaning on operational criteria rather than a conceptual definition (Scanlon, 2013, p. 27). The guidelines for a good definition state that it should represent an understanding of the entity it defines; it should lend a direction to future considerations of that entity, it should inform members in the field for examples about who to include in the research study; it should also serve as a model to determine the scopes of laws and policies (Scanlon, 2013, p. 28). Although the term *"barriers to learning"* does not meet the criteria of a good definition and may be viewed as inaccurate as a good definition should be, one can observe that the definitions utilised by the DoE are not diagnostic terms but merely operational and should only be used as guidelines for identification of learners who require further diagnostic assessment and intervention. To avoid confusion about what specific learning disabilities are, this study prefers the use of conceptual definitions which are regarded more neutral, direct and concise.

The American Psychiatry Association (APA)'s latest diagnostic criteria, the Diagnostic and Statistical Manual of Mental disorders, 5th Edition (DSM-V), states that specific LD is *"history or current presentation of persistent difficulties in the acquisition of reading, writing, arithmetic or mathematical reasoning skills during the formal years of school"* (Montague & Cavendish, 2012 p. 3). The clear identification of the academic manifestations is praised as it indicates that specific LD identification is based on academic skills despite the nature of a presumed underlying and unspecified central nervous system disorder. Moreover, the key academic manifestations of specific LD are associated with a conceptualisation of a LD that has to do with a language processing disorder (Scanlon, 2013).

While it is imperative to use conceptual definitions to explain specific LD, using a neutral, direct and concise definition does not necessarily simplify issues nor eliminate variety. (Flack, 2009) noted that there is risk of tunnelling one's vision in accepting a purely medical interpretation of LD and suggested that the focus should not be on deficits noted in a child with specific LD. Practitioners should consider the learner holistically taking into consideration that learner's needs, own experiences and the influence of his or her context (Flack, 2009). The current conceptual definitions imply that extrinsic or environmental factors impact but do not cause specific LD and relate to social, economic and cultural aspects as not relevant as constitutional influences in explaining brain or language

development (Fletcher, et al., 2005). On the contrary, South African research has demonstrated the significant role of socio-linguistic factors such as bilingualism, socio-economic factors including poverty and child-headed homes, disparity in the quality of education services and psychological factors in the development of language competency and learning (Morrow, Jordaan & Fridjhon, 2005; Kallenbasch, 2007; Bangirana, John, Opoka, Byarugaba, Kurek & Boivin, 2009; Navsaria, Pascoe & Kathard, 2011).

This study elects to use the term Language-based learning disability (L-b LD) instead of specific LD for improved accuracy and clarity. Specific learning disability or language-based learning disability is defined as a brain based difficulties in reading, writing, math, organisation, focus, listening comprehension, social skills, motor skills or a combination of these (National Center for Learning Disabilities, 2013). Language-based learning disability (L-b LD) may manifest itself in imperfect ability to listen, think, speak, read, write, and spell or to do mathematical calculations and includes conditions such as perceptual disabilities, brain injury, minimal brain dysfunctions, dyslexia, and developmental aphasia (American Speech-Language Hearing Association, 2015). Furthermore, L-b LD does not include a learning problem that is primarily the result of visual, hearing or motor disabilities, intellectual disability, and emotional disturbance or of environmental, cultural or economic disadvantage (National Center for Learning Disabilities, 2013). The term also excludes learning difficulties due to use of more than one language in the home or school. Therefore, the term Language-based serves to put an emphasis on specific verbal as opposed to non-verbal factors that influence learning disability (Fuchs, Deshler, & Reschly, 2004).

Furthermore, the term language-based learning disability (L-b LD) is preferred because of the relationship between spoken and written language. Many children with reading problems have spoken language problems (Roseberry-McKibbin, 2008). Language-based learning disabilities manifests in multiple domains of academic functioning but primarily in the domain of literacy such as vocabulary acquisition, reading and writing (American Speech-Language Hearing Association, 2015). Documenting the learner's sub-type of L-b LD, for example, reading or math, precludes the secondary sub-types and limits the condition. This may result in undercounting the incidence of non-specific learning disabilities (Scanlon, 2013). Consequently, for the purposes of this study, L-b LD refers to specific and non-specific LD. It includes dyslexia, dyscalculia and dysgraphia, considering that language proficiency is the underlying cause of the individual's difficulty and not specific to a skill

(National Center for Learning Disabilities, 2013). For instance, an impairment in working memory, an underlying process, could result in a reading as a well as a math difficulty. Hence, the focus of speech–language pathology is treatment of the underlying language processing disorder not just the outcomes (American Speech-Language Hearing Association, 2015).

The following Figure 2.1 illustrates the meaning of the term L-b LD as understood in this research project. This research study acknowledges the existence of various barriers to learning observed in the classroom. This study elects to focus on causative underlying conditions that manifests as L-b LD which should be targeted for intervention by SLTs. These are categorized as specific causative factors which include auditory perceptual disorders, language processing and neurological factors as possible underlying conditions (Anthony, Anthony, & Dunkelberger, 2011). They manifest as verbal and non-verbal L-b LD. These manifestations are observed as possible barriers to learning in the classroom setting.

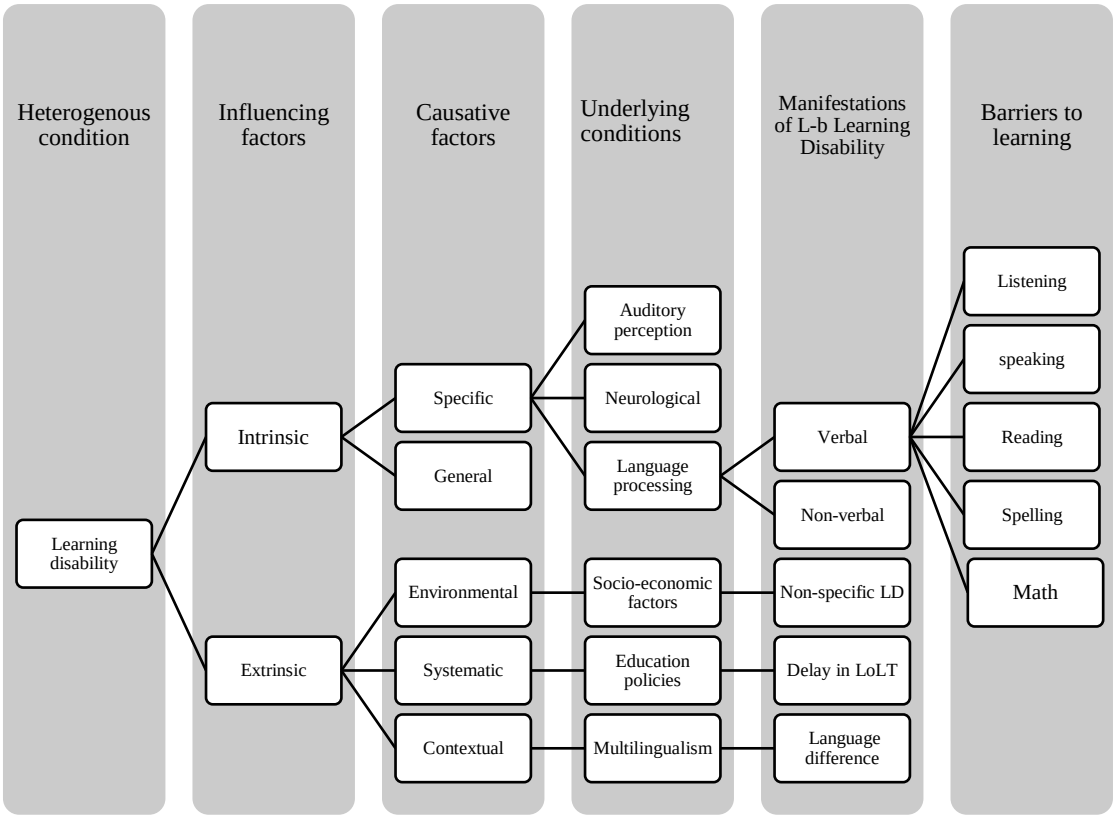


Figure 2.1 Model Defining Language-based Learning Disability for South African Context

In Figure 2.1 extrinsic influencing factors include environmental, systematic and contextual dynamics. These are acknowledged as potential underlying conditions to LD in general and they may influence the severity of L-b LD.

This study makes an assumption that ESL or isiZulu-English learners may indeed present with L-b LD despite the common assumption by most in education that these learners fail to accomplish academically because they are ESL learners (O'Connor & Geiger, 2009). It is crucial to note the nature of difficulties observed in both languages for differentiation between a conditions of language difference which, is due to a normal second language learning process versus L-b LD which is neurologically based (O'Connor & Geiger, 2009). It is also critical for correct identification of delayed language development in one of the languages versus a general language impairment affecting all languages the learner uses. For bilingual or English second language (ESL) learners, L-b LD implies that the impaired underlying processes should be observed in both the first and the second language (Stow & Pert, 2015).

2.3 Systems Approach to Early Prediction

There are many systems that impact on a learner's developmental outcomes. The discussion on definitions of L-b LD above has alluded to some of these systems and noted the limitations of existing definitions. The bioecological approach to human development makes two main propositions regarding human development. Firstly, that child development takes place through processes of progressive reciprocal interaction between active proximal processes. These proximal processes exist in the child's immediate environment forming the child's microsystem. (Bronfenbrenner, 1994). The second proposition is that the form, power, content and direction of the proximal processes affecting development varies systematically as a joint function of the characteristics of the developing child, the immediate and remote environment as well as the nature of the developmental outcomes under consideration (Bronfenbrenner, 1994). The bioecological model to human development includes five systems which constantly interact: the micro-, meso-, exo-, macro- and the chrono-systems (Bronfenbrenner & Morris, 2007). This study proposes that the systems approach should be adopted in the analysing the early predictors of L-b LD as well as in the evaluation of learners for L-b LD. The motivation for the adoption of a systems approach is based on the adjusted Process- Person-context-Time model which states that different systems are the contexts of individual's development (Bronfenbrenner & Morris, 2007). Isolating the learners from their environments yields to inaccurate assumptions about the nature of the conditions that affect them and this is a critical consideration for L-b LD.

The view that education is an open system was not only promoted by Broffenbrenner but was formed on the basis of Ludwig Von Bertalanffy's general systems theory (Bertalanffy, 2013). The general systems theory recognises that single disciplines interact in a complex way and need to be understood using a unified inquiry (Bertalanffy, 2013, p. 407). Systems thinking enables educators to use concepts such as continuous incremental improvement, organizational learning, and feedback loops (Thornton, Peltier, & Perreault, 2004, p. 222). Systems thinking in education views all processes as parts of an overall system. There is interactions among social, political, cultural, religious and economic systems that affect student achievement, staff training and development programs (Furst-Bowe, 2011, p. 2). Relating the systems approach to a learner with L-b LD, the parameters in the learner's home or school environments may invite, permit or inhibit engagements in sustained, progressively more complex interaction with the immediate environment.

Diverse views about the nature of L-b LD, its cognitive characteristics, the influence of the environment, teaching methods and the intervention approaches results in conflicting views about assessing intrinsic factors through achievement tests (Furnham, Monsen, & Ahmetoglu, 2009). Limitations of the general intelligence approach are disputed by current advances in assessment and intervention of children with L-b LD. Factors such as home environment, poverty status, and pre-school experience, quality of school environment, child's temperament, motivation and peer relations have been found to be mediators of children's cognitive abilities (Mann, McCartney, & Park, 2007). These mediators operate in various systems that affect the learner with L-b LD over time. Consideration of various systems is specifically relevant in the South African context considering diversity in languages and culture as well as the disparity in the quality of education related to the historical and economic differences in the population.

The following Figure 2.2 provides a schematic view of some of the possible systems that are proposed to interact for learners with L-b LD that are relevant for this research project.

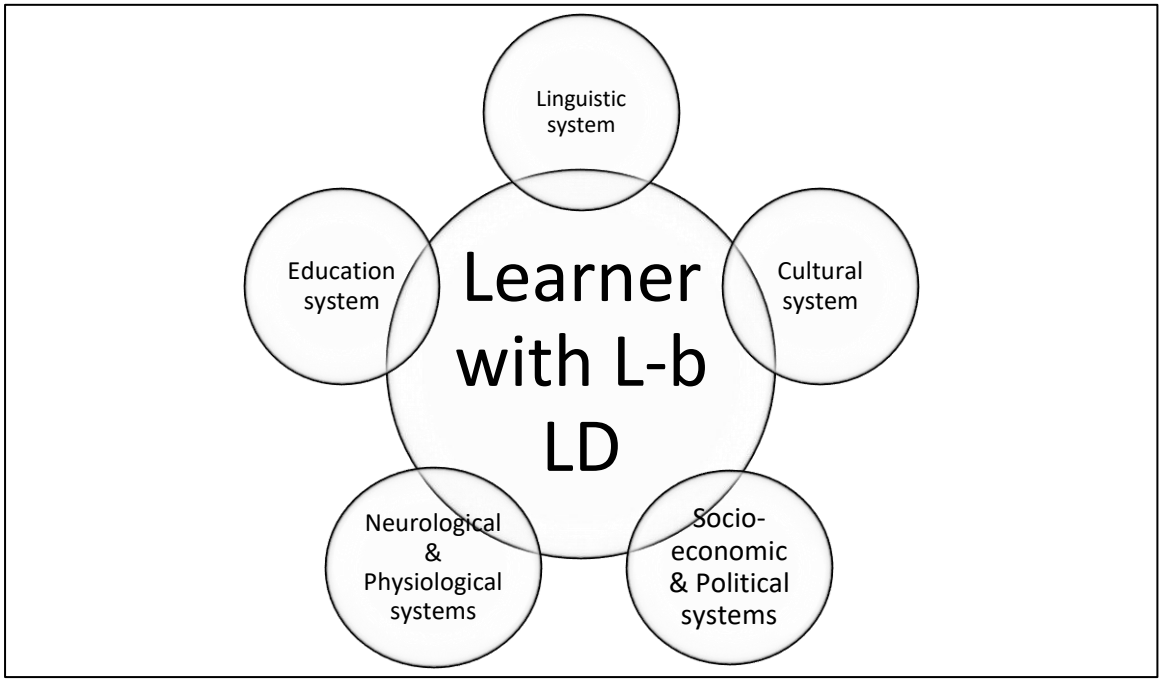


Figure 2.2 The Microsystems of Language-based LD

In figure 2.2 the focus is on the learner as the main system of interest. The figure displays that systems that have an effect on a learner and may contribute risk and preventive factors for L-

b LD. These micro and macro systems provide valuable information for language assessment in speech therapy contexts in South Africa.

2.4 Early Indicators of Language- based Learning Disabilities

The following review of early indicators of L-b LD serves to clarify the indicators that are relevant to specific language-based learning disabilities. It starts by highlighting neurological factors that are universally believed to predict L-b LD whose relevance needs to be confirmed for isiZulu language and the multilingual South African context since these have been studied mostly in English. Clinical and non-clinical indicators have been proven to predict the possibility of L-b LD (Murray & Wren, 2003; Mazocco & Thompson, 2005; Mann, McCartney & Park, 2007). Early indicators that a child may have L-b LD include delays in speech and language development, motor coordination, perception, reasoning, social interaction, prerequisites to academic achievement and other areas relevant to meeting educational goals. These indicators may occur concomitantly with problems in self-regulation, attention, or social interaction (Tranter & Kerr, 2016).

The language processes that are involved in reading and writing are typically receiving, processing, storing and responding to auditory, visual or spatial information (Frijters,Lovett, Steinbasch, Wolf, Sevcik & Morris, 2011). These processes require encoding of linguistic information for later analysis and synthesis which is a cognitive process hence, they are also referred to as neurological processes. There is strong evidence that these neurological processes underlie vocabulary development and spoken language comprehension (Baddely, Gathercole, & Papagno, 1998). Neurological processing can be assessed through skills in expressive language, comprehension, phonological awareness, rapid automated naming and following directions (Frijters, et al., 2011).

2.4.1 Listening Skills and Following Directions

Listening is defined, in the National Revised Curriculum Statement Grades R-9, as an outcome where "*the learner is able to listen for information and enjoyment and respond appropriately and critically in a wide range of situations*" (Department of Education, 2002, p. 20). From a clinical perspective, listening skills are regarded as part of receptive language skills and they are directly linked to phonological awareness skills (Rvaschew, 2007). There is evidence that listening or verbal comprehension is an important component of general oral language proficiency and highly correlated with reading comprehension (Gottardo, Collins,

Gebotys, & Baclu, 2008). Listening shares unique links with short term memory ability as discovered by Alloway, Gathercole, Adams, Willis, Eaglen and Lamont (2005, p. 425).

Auditory perceptual abilities are a strong concurrent correlate of phonological awareness skills. Auditory temporal processing, which is an important skill for listening, was also reported to be relevant for reading and language. Children with dyslexia were found to show deficits in tasks requiring the processing of rapid visual and auditory stimuli (Smit, Trainor, Gray, Planting, & Shore, 2008). Furthermore, improving the basic rhythmic sensory processing skills of all children via enriched linguistic and musical activities in infancy and early childhood was found to benefit phonological and language development and consequently benefiting reading development (Sullivan, Popp, & Raphael, 2011). In summary, L-b LD may manifest in impaired listening skills which is indicated by limited verbal comprehension, limited ability in following verbal directions, auditory temporal processing and rhythmic sensory processing.

2.4.2 Speech and Language Skills

From an educational perspective speaking is the ability to communicate confidently and effectively in a spoken language in a wide variety of situations while language structure and use of sounds and words is also considered important to create and interpret texts (Department of Education, 2002, p. 20). The component skills for speaking or expressive language as referred to by SLTs include articulation, phonological processing, expressive vocabulary, language content, structure and use. A relationship between phonological awareness and articulation accuracy has been reported for children who have and those who do not have a speech or language disorder (Rvachew, 2006). Phonological awareness is a broad term referring to the ability to focus on the sounds of speech as distinct from its meaning (Konza, 2011). Language ability and vocabulary size have consistently been found to be concurrent and longitudinal predictors of phonological awareness.

Although speech sound system disorders and specific language impairment are independent disorders of language skills, features of these disorders such as poor phonological processing, poor phonological awareness and weak oral vocabulary can also be predictive of L-b LD. Children with speech sound disorders (SSD) were found to have significant difficulty with phonological processing (Anthony, Anthony, & Dunkelberger, 2011) and phonological awareness (Rvaschew, 2007). Regarding English additional language speakers, weak oral

language skills, as measured by receptive and expressive language test in the first language, were found to impede the development of reading comprehension in the first or second language while phonological awareness in the child's first language is important for word reading in the second language (Gottardo, Collins, Gebotys, & Baclu, 2008). Research shows that for bilingual learners oral proficiency in the first language (L1) is a significant predictor of second language (L2) reading (Gottardo, Collins, Gebotys, & Baclu, 2008). Orthographic and cognitive factors in L1 were found to have concurrent development with basic reading skills in L2 (Siegel, Share, & Geva, 2000). It is reported that pseudo word repetition and phonological awareness in L2 were predictors of children requiring extra assistance in acquiring English vocabulary and reading (Gottardo, Collins, Gebotys, & Baclu, 2008).

2.4.3 Reading Abilities

The ability of the learner to read and view for information and enjoyment and respond critically to the aesthetic, cultural and emotional values in texts is the relevant outcome in the Revised National Curriculum Statement in South Africa (Department of Education, 2002, p. 20). Clinically, five essential component skills that have been adopted for reading development are alphabetic principles, phonemic awareness, oral reading fluency, vocabulary and comprehension (Paris, 2005). Phonemic awareness is a subskill of phonological awareness in which listeners are able to hear, identify and manipulate phonemes (The National Reading Panel, 2000). Phonemes are the smallest units of sounds that make a difference to a word's meaning (Armbruster, Lehr, & Osborn, 2003). Phonemic awareness is not the only skill required to learn to read but one must have it in order to develop reading skills. It is stated that phonemic awareness is a means not an end. There are four major areas of phonemic awareness including: sound and words discrimination, rhyming, blending and segmentation (Clemence & Shapiro, 2011).

Difficulties in phonemic awareness appear to be the core deficit for many children with dyslexia, specific language impairment and speech sound system disorders (Gillon & McNeill, 2009). A deficit in this area has been proven to result in persistent reading disorders such as dyslexia (Gillon & McNeill, 2007).Therefore, phonemic awareness is the powerful predictor of early reading development and oral language development (Stanovich, 2005). Segmentation is a subskill of phonemic awareness and segmentation was found to be a measure of predicting progress in learning to read. It was found that learners performed better in blending and isolation compared to segmentation and deletion (De Graaff, Hassleman,

Verhoeven, & Bosman, 2010). Reportedly pseudo words or non-words, are a potent predictor of reading abilities at all levels as they can be used effectively to teach syllabification (Stanovich, 2005). Phonemic awareness is the best predictor for reading success thus far (Sullivan, Popp, & Raphael, 2011; Frijters, et al., 2011).

South African studies assumed the applicability or universality of certain indicators and adapted available tools to assess these indicators (De Sousa, Broom, & Fry, 2011; Alcock, Ngorosho, Deus, & Jukes, 2010). Phonemic awareness reliably predicted word recognition, reading fluency in Northern seSotho and word recognition in English for these bilingual learners (Wilsenach, 2013). Further exploration of the relevance of some phonological awareness skills and vocabulary size, comparing bilingual Northern Sotho-English and monolingual seSotho speaking learners was done. (Wilsenach, 2013). The indicator phoneme awareness was identified in seSotho whilst learners had established the concepts in English (Wilsenach, 2016).

Regarding bilingual learners, phonological awareness in the first language (L1) is predictive of the second language (L2) word reading (Gottardo, Collins, Gebotys, & Baclu, 2008). Metacognition is another important parameter to consider as predictive of success in reading particularly for ESL users. English second language students who are taught reading comprehension are more successful readers. English second language users employ a variety of strategies that require reader's metacognitive processing before, during and after reading texts in order to improve their reading comprehension (Iwai, 2011). Useful metacognitive strategies for reading were found to be planning, monitoring and evaluation strategies (Iwai, 2011). Learning metacognitive strategies, how to use them and evaluating their use is key to the development of reading comprehension for students whose first language is not English (Iwai, 2011). Metacognition is generally fundamental in a variety of areas such as oral skills, reading, writing, language acquisition, memory, math skills and social interactions (McClelland, et al., 2007). Therefore, expressive language skills including vocabulary, metacognitive skills and general language abilities are good predictors of risk for L-b LD for children who are both first and second language speakers of English.

An investigation into predictors of word reading among grade 2 to 5, Herero-English bilingual children indicated that in Herero speaking children, phonological awareness and non-word repetition reliably predicted word reading in both languages (Veii & Everatt,

2005). Furthermore, learners progressed faster in reading Herero than English because it is more orthographically transparent than English (Veii & Everatt, 2005). Another supportive study for relevance of phonological awareness indicated that the ability to read letters in Swahili was associated with a variety of phonological awareness skills especially implicit phonemic awareness tasks such as counting syllables and repeating non-words (Alcock, Ngorosho, Deus, & Jukes, 2010). The investigation of the effects of isiZulu and English phonological awareness skills on the acquisition of reading and spelling in English (De Sousa, Broom, & Fry, 2011). The results specified that more phonological awareness skills related to English spelling than to isiZulu spelling, casting doubt into the relevance of phonological awareness skills for reading and spelling in isiZulu language. For monolingual and bilingual isiZulu speakers, phonological awareness predicted word reading and reading comprehension but different subskills of phonological awareness predicted reading tasks in English compared to isiZulu language (De Sousa, Broom, & Fry, 2011).

2.4.4 Written Language and Spelling skills

As an educational outcome at a basic education level, the ability to write different kinds of factual and imaginative texts for a wide range of purposes is what constitutes adequate writing skills (Department of Education, 2002). Written language together with spoken language and reading contribute to the process of literacy (Nelson, 2006). A disorder of written language involves a significant impairment in fluent word recognition (i.e. reading, decoding and sight word recognition), reading comprehension, written spelling or written expression and written composition (Kamhi & Catts, 2012; Tunmer & Chapman, 2007, 2012). Stagg-Peterson proposes that writing deepens understanding of new concepts as learners can reflect on thoughts (Stagg-Peterson, 2014). There are generally three difficulties regarding writing skills. These are: fine motor challenges of handwriting, the thinking process involved in writing and difficulty with conforming to writing conventions (Stagg-Peterson, 2014). Writing is composed of both a physical and a cognitive process. The written product requires spelling, punctuation and grammar conventions.

Semantic and syntactic development impact on written language development. Written language processes also include metacognition and self-regulation skills such as planning, organising, drafting, reflecting, revising, editing as well as forming letters and sequences of letters into words also known as spelling (Nelson, Roth, Scott, Meter, & Troia, 2006). Therefore, phonemic awareness does not only predict early reading but spelling development

as well (Bryant, Bradlely, MacClean, & Crossland, 1989). This prediction may be more accurate than intelligence scores, age and socio-economic status in pre-school children.

A research study by Wallis and Birt (2003) found that writing scores were equivalent to scores in complex memory span and phonological awareness. This implies that for spelling and general writing skills, short term memory, rapid automated naming (RAN) and phonological awareness are predictors of success. Short term memory is defined as the type of memory that can hold a limited amount of information in a very accessible state temporarily (Courage & Cowan, 2009).

Working memory is defined as the set of activated memory elements that are used to plan and carry out a behaviour (Courage & Cowan, 2009). Some authors refer to working memory in relation to phonological skills as the phonological short term memory ability (Sullivan, Popp, & Raphael, 2011). Working memory is also associated with proficiency in reading. Swanson, Zheng and Jerman (2009) found that children with reading disabilities are disadvantaged in working memory and short term memory. Additionally, word recognition, orthographic, semantic, metacognitive and working memory measures to be all deficient in learners with L-b LD who also tested within the average IQ range (Swanson & Alexander, 1997).

2.4.5 Math Skills

Mathematics involves observing, representing and investigating patterns, quantitative relationships in physical and social phenomena and between mathematical objects themselves. Through the understanding of specialised mathematics language, a learner can acquire mathematics concepts, build new mathematical ideas and insights are generated (Department of Education, 2002, p. 21).The five main educational outcomes for mathematics in primary education require recognition, description, representations of numbers and their relationships, counting, estimation and checking with competence in problem solving skills (Department of Education, 2002, p. 21). Multiple systems are used to convey meaning in math including oral and written language, mathematical symbols and visual representation of language. From a speech and language pathology point of view, language plays a critical role in mathematics learning (Richter, 2013, p. 9).

Number competence is the knowledge of numbers and understanding of numerical relationships. This concept of number competence is essential to the ability to recognise the numerical values of small quantities without counting, to discriminate between and among

quantities, to make judgements about the magnitudes of small numbers to meaningfully count objects and to perform simple additional and subtraction calculations (Jordan & Levine, 2009). Number competence includes the ability to visualise numbers on a number line and understand that each number is one more than the previous number. Poorly developed counting procedures, slow fact retrieval and inaccurate computation all reflect weak number competence. Weakness in number competence is described as the root of mathematics learning difficulties (Jordan & Levine, 2009).

Indicators of math learning disability include weak numeric processing skills such as reading numerals, number constancy, magnitude judgements of one digit numbers, mental addition of one digit as well as counting principles and number line concepts (Mazzocco & Thompson, 2005). Cognitive underpinnings of math learning disability were found to be the same for children with and without co-occurring reading disorders. For instance, verbal short term memory, phonological memory, math fact retrieval skill was found to be poor in children with math learning disabilities (Mazzocco and Thompson, 2005:142). Working memory (WM) deficits were found to be broad and not just specific to digits (Mazzocco & Thompson, 2005) .

The effect of intelligence on the early predictors or use of IQ as a predictor of L-b LD is contradictory in literature (Frijters, et al., 2011). Some researchers believe that there is no relationship between IQ and learning ability and some dispute the validity of statistical methods used (Cahan, Fono, & Nirel, 2012, p. 107). Murray and Wren (2003:407) found strong correlations between non-verbal and verbal IQ as an indicator of L-b LD. Some studies report that IQ in learners with L-b LD was found to be significantly lower than that of children without Lb-LD (Karande, 2008, p. 75). Other studies correlated high or above average IQ in the midst of poor school performance as an indicator of L-b LD (Karande, 2008:75). Overall, research shows that there are mixed and small effects for IQ as predictor of responsiveness to intervention in children and in word identification outcomes (Fuchs, Mock, Morgan, & Young, 2003). Intelligence quotient is not important for remedial outcome and current best practice prefers complete instruction with explicit instructions, repeated practice and structured attention for all learners with L-b LD (Frijters, et al., 2011, p. 3). A summary of intrinsic or neurologically based L-b LD indicators are summarised in the following Figure 2.3.

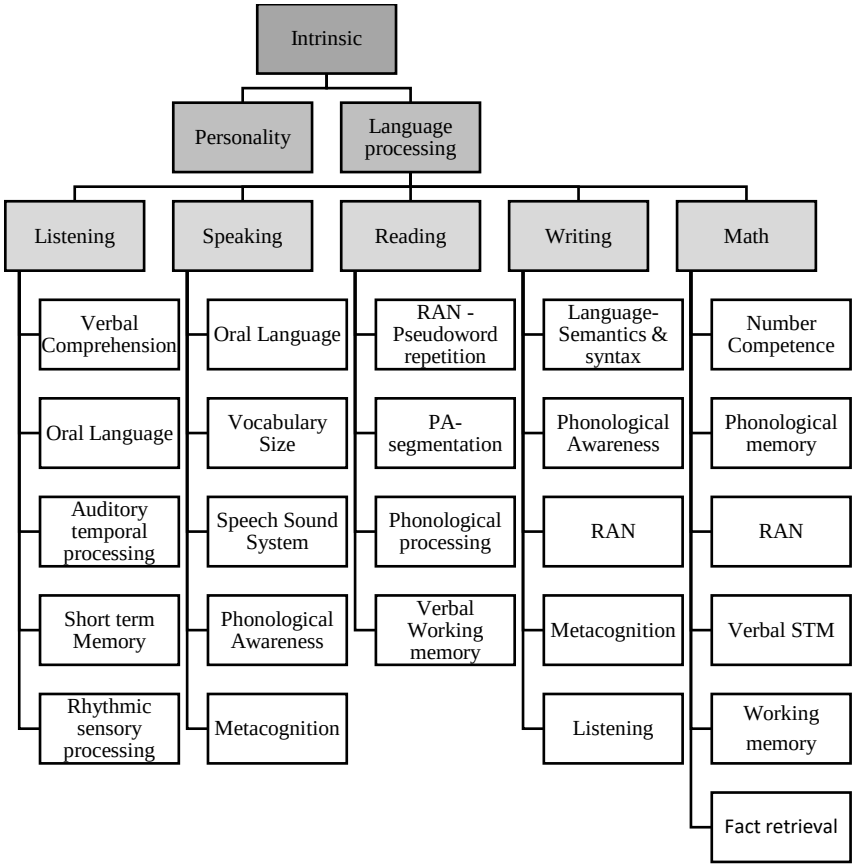


Figure 2.3 Intrinsic Early Indicators of Language-Based Learning Disabilities

Figure 2.3 summarises the early predictors of L-b LD identified in this study. These predictors have underlying neurological processes. Therefore, these indicators are expected to be observed in isiZulu speaking learners with L-b LD.

2.5 Extrinsic Predictive Factors

Extrinsic factors can be described as factors that have a direct impact on the learner although they may not be directly linked to the learner. Generally, the environmental predictors of L-b LD seem to indicate the severity of the disability and the success of intervention or performance once intervention is offered. Findings from a comparative study indicated that variables other than traditional cognitive and academic skills are important for determining the performance of youth with learning disability in college (Murray & Wren, 2003).

Environmental factors in the home such as parental awareness, and parent's negative behaviour, or at school such as poor instruction in class, teacher's negligence in the class and lack of remedial classes are some of the environmental factors listed as perpetuating L-b LD

among children (Kavita, Sharmilla, & Darshan, 2012). A review of articles in the Chinese Journal of Child Health Care revealed a number of studies that looked at family influential factors to L-b LD identified factors such as parent anxiety (once the child is diagnosed with L-b LD) and worry about their child's studies to significantly correlate to L-b LD (Kavita, Sharmilla, & Darshan, 2012). Furthermore, Mann, McCartney and Park (2007:273) added that the home environment, poverty status, prior pre-school involvement and quality of the school environment are mediating factors to L-b LD.

It has been established that home and school environments determine science achievement of learners in South Africa (Juan & Visser, 2017). A study that analysed the results of students who participated in the International Assessments for Maths and Science (TIMMS) included South African learners from varying backgrounds. It revealed strong correlations between speaking the language of the test at home and achievement in maths and science by grade 9 learners (Mullis, Martin, Foy, & Arora, 2011). This study has implications for primary school level teaching as it concluded that language skills in general were the predictor of success in maths and science. There were strong relationships found between the language and science achievement. For Grade 9 students, competency in the language of the test (English) was the predictor of achievement. Therefore, the language of learning and teaching (LoLT) has to be mastered by the time students reach grade 9 (Mullis, Martin, Foy, & Arora, 2011).

Socio-economic factors can be defined by family income, level of poverty in the child's neighbourhood and educational attainments of parents (Jordan & Levine, 2009). Children in poor families are 1.5 times more likely to have a learning disability and two times more likely to repeat a grade than are their non-poor counterparts. Achievement in maths is strongly associated to socio-economic status (Jordan & Levine, 2009). Parental social class and educational level predicts mathematics achievement throughout primary and secondary school (Jordan & Levine, 2009). The following Figure 2.4 is a summary of literature review on extrinsic indicators of L-b LD.

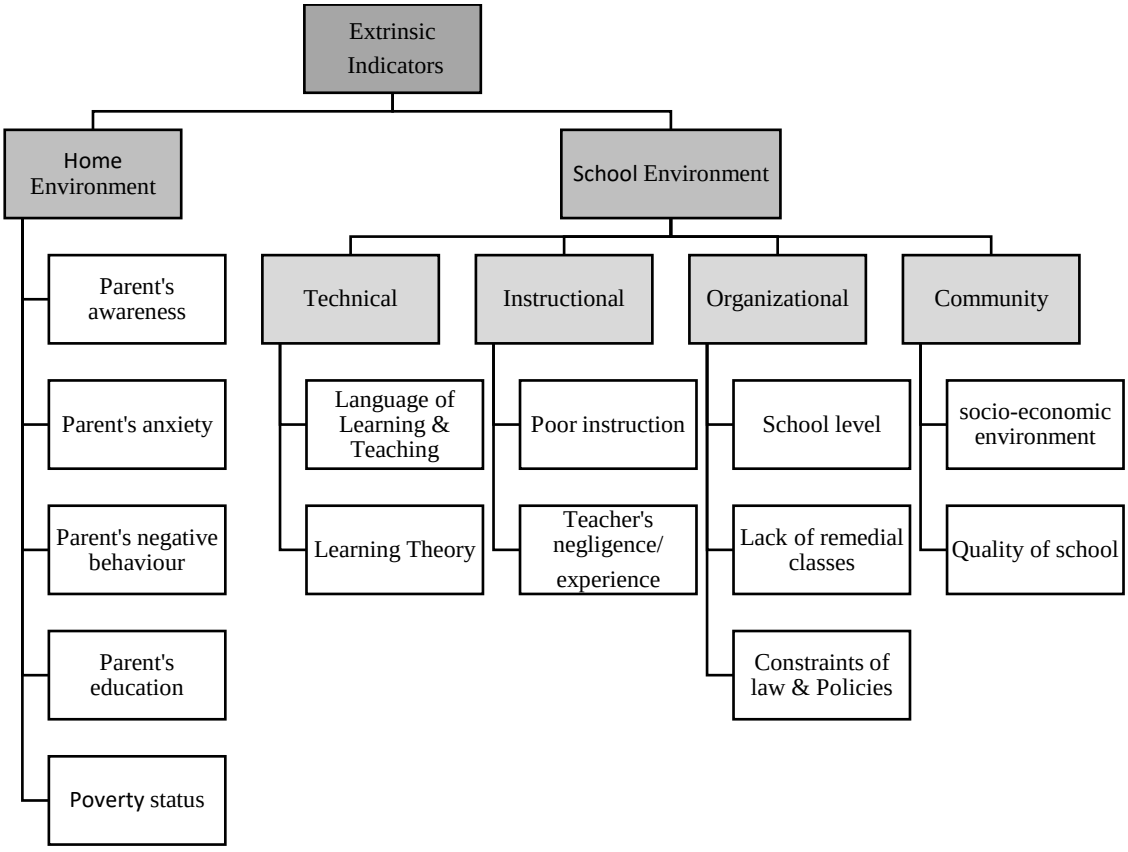


Figure 2.4 Extrinsic Indicators of Language-based Learning Disabilities

The relevance of the early predictors discussed here and shown in Figures 2.3 and 2.4 is unconfirmed for the South African school population as most predictive and longitudinal studies did not involve South African children. In South African research, available studies offer conflicting evidence due to methodological issues such as size and the type of tools utilised to gather data. There is a pattern in the results obtained where language or phonological skills are compared between English and an African language. As expected, the results tend to indicate weaknesses in favour of results obtained in English. For instance, ESL learners obtained low means in the 3 subtests of the Diagnostic Evaluation of Language Variation (Kallenbach, 2007). The results obtained in a longitudinal study involving ESL learners who presented as "*slow to learn"* in English also indicated that ESL learners performed more poorly than monolingual learners who were also observed to be "*slow to learn".* ESL learners had poor reading comprehension, vision-spatial, short term and working memory abilities (Rijhumal, 2011). ESL students performed below the level of their monolingual English L1 counterparts in auditory vocabulary and reading comprehension (Lathy, 2006:i). While up to 70% of ESL learners do not meet grade appropriate learning outcomes it should not be a surprise when performance in language related skills is lower

than that of L1 English speakers (Navsaria, Pascoe, & Kathard, 2011). Focus needs to shift from the weaknesses expected in ESL learners. SLTs need to recognise that the deficiencies observed in a group of ESL learners cannot be uniform. SLTs need to find ways to mine out the strengths of ESL learners using innovative methods and tools designed for that purpose. More importantly, the tools used to evaluate ESL learners in South Africa need to be originally developed for the languages concerned. Findings by Navsaria *et al.* (2011:97) revealed that there are barriers at the school system, the individual learner, and the home level which contribute to L-b LD in South Africa. Thus when looking for L-b LD indicators, SLTs cannot ignore the whole system and zoom in on the intrinsic indicators in the child's microsystem alone.

2.6 The Education System

Education in South Africa can be divided into five sectors namely: early childhood development, general education and training, further education and training, special needs education and higher education and training (Department of Education, 2008, p. 2). The interest for this research is on the foundation phase of the general education and training involving children from age 7 years in grade 1 to grade 3. Schooling is compulsory for all children aged 7 to 15 in South Africa. However, net enrolments drop significantly after grade 3, suggesting that many learners are falling behind the age-grade norms and decline even markedly after grade 9 or age 15 (Department of Education, 2008). For this reason, these grades tend to be focal points of assessment of progress in the education sector and for research studies such as this one.

An open system is a type of system that keeps evolving and its properties keep emerging through its interaction with the environment (Banathy, 1996). The education system is regarded as an open system since it interacts and has interdependence with the social, economic and political institutions (Banathy, 1996). Among other issues that impact on education in South Africa are the HIV infection of 11% of teachers and 6 % learners, 7% poverty or hunger for children attending school and long distances to school for at least 6% of the children (Department of Education, 2008). Schools are essentially living systems as there is constant interaction with their communities and other institutions around them (Oyebade, 2001). Geldenhuys and Wevers (2013) used the ecological model to assess the implementation of inclusive education for learners with barriers to learning including learners

with L-b learning disorders. This study, positioned in the Eastern Cape involved mainstream schools in rural areas, revealed the impact of various microsystems on the learner's achievement. The study revealed that the home, peer group and school have significant impact on the learner's potential to achieve and to be successfully included in classrooms. Factors such as parents' denial about the learner's learning difficulties, unsympathetic behaviour, lack of support, lifestyle and low education levels were cited as some of the challenges for the achievement of learners with barriers to learning (Geldenhuys & Wevers, 2013).

The lack of collaboration between the home and school environments is a major challenge to inclusion of learners with barriers to learning (Schulze & van Heerden, 2015). There is a significant role played by the teachers in motivating students for achievement. The study revealed that teachers create an enabling learning environment which increases achievement in math and science in South Africa (Schulze & van Heerden, 2015). At a macro level the systems that have an impact on the inclusion of learners were the law and policies in place (Geldenhuys & Wevers, 2013). The following figure 2.5 depicts the educational system with the learner being in the centre as the target unit of the system.

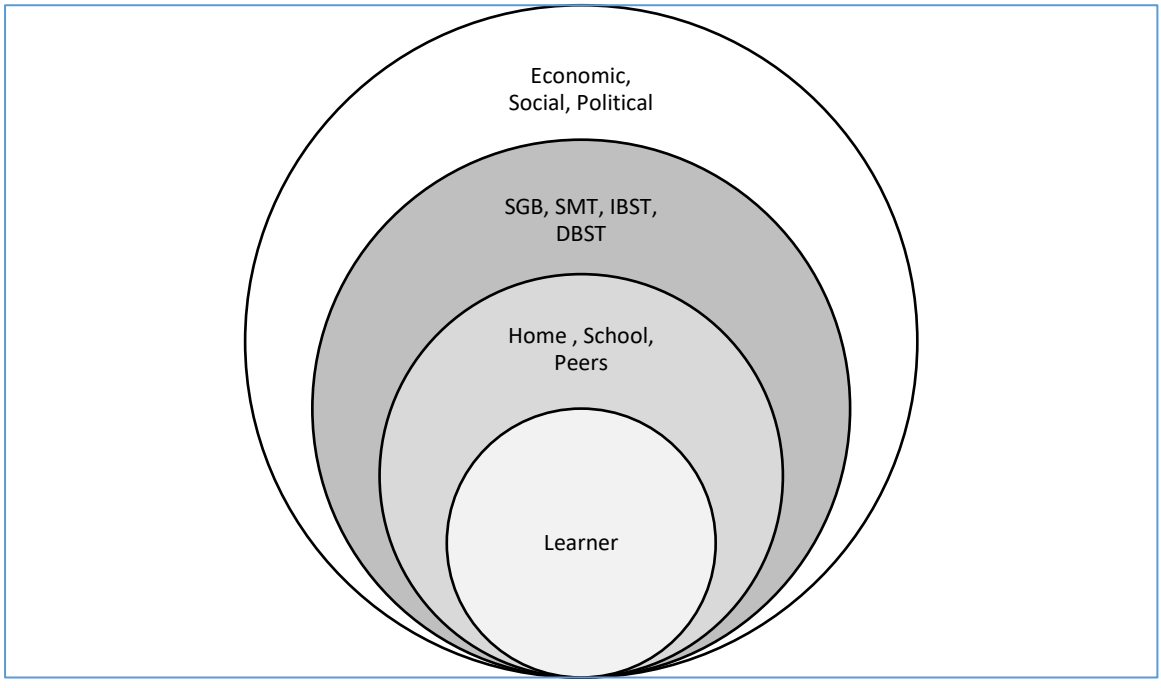


Figure 2.5The Education System (Geldenhuys and Wever, 2013)

Figure 2.5 shows the interaction of the sub-systems, including implementation of the various laws in schools, the school circuit and districts should resolve conflicts between assessment and curriculum for learners with barriers to learning.

2.7 The Linguistic System

Language in education forms an integral part of the Schools Act in South Africa. It is supported by the United Nations Organisation for Education, Science and Culture (UNESCO) findings that language and communication are without a doubt two of the most important factors in the learning process (Bloch, 2000). Therefore, the Project for the Alternative Education in South Africa (PRAESA) encourages the availability of local data, the production of local language assessment materials and books to support the policies on multilingualism (Project for the Study of Alternative Education in South Africa, 2017)

In the period between 1998 and 2007, a growing number of South African learners attended school in English, not their home language. Recent South African statistics indicate that this situation has not changed, making Africa the only continent where the majority of the learners start school using a second language (Project for the Study of Alternative Education in South Africa, 2017). Flack, Pahl and Mdlalo, (2015:88) state that the unique nature of the South African population is not in the fact that it is a multicultural country but it is in the fact that the majority of the population is multilingual and multicultural yet they use English, a language not used in the home, as the language of learning and teaching. The issue of the tester's own culture and language interferes with the analysis of results (Mdlalo, Flack, & Joubert, 2016).

In the South African context, the term bilingual may refer to learners who speak English and another language at home. It may also refer to learners who use English as LoLT but does not use this language at home. Such a learner is often referred to as English second language learner in other contexts. It may also refer to a learner who does not use English as LoLT but has a regular exposure to English, have acquired a fair understanding and has the basic command of the language through social media and social interaction (Moodley, Kritzinger, & Vinck, 2016). Bilingualism is recognized as a complex and diverse concept which has many connotations (De Lamo White & Jin, 2011). This study adopts the understanding which defines bilingualism as an ability to communicate in two or more languages, in a variety of modalities and to varying levels of proficiencies (Royal College of Speech and Language

Therapists, 2007). Bilingualism offers challenges for SLTs as the clinician must differentiate between a fundamental speech and language disorder and other perceived difficulties which may result from use of an additional language. These difficulties are superficially similar to those exhibited by children with developmental speech and language disorders (De Lamo White & Jin, 2011).

Bilingual speakers acquire and use their languages for different purposes in different domains of life with different people (Grosjean, 2009, p. 4). This is termed complementary principle and shows that there variability of language proficiency amongst bilingual learners (Grosjean, 2009, p. 2). It is crucial to acknowledge that a bilingual learner may not develop both languages equally in terms of fluency and size because the demand and uses of languages are different. Moreover, language proficiency is dependent upon factors such as the child's age, intensity of exposure to a language, opportunity and motivation to use the language. (Grosjean, 2009). Furthermore, bilingual learners may not present in a similar manner as monolingual learners despite the absence of L-b LD (Saville-Troike, 2006). Due to the varying degree of competency in both English and the home language, this study prefers the use of IsiZulu-English speaking learner to refer to ESL learners who may not be fully bilingual and to bilingual learners who may also be using isiZulu or English as LoLT.

The communication outcomes of bilingual learners may indicate a difference in competency levels between the learner's primary language and their additional language or L2. This language difference should be observed in order to differentiate between specific language impairment and language difference in this population (Grosjean, 2010). A longitudinal study of bilingual Swedish-Arabic children aimed to find a way to measure the children's two languages (Hakansson, Salameh, & Nettelbladt, 2003). The study reported that it is possible to differentiate between the children with language impairment and normal language development in bilingual children (Hakansson, Salameh, & Nettelbladt, 2003). A developmental approach is recommended when assessing bilingual learners in both languages that they are tested (Hakansson, Salameh, & Nettelbladt, 2003).

Furthermore, exposure to English or the second language did not seem to be a factor in how competent the children become in both first and second languages. All children were exposed to Swedish at school during the day and Arabic at home and they developed both their languages to comparable levels (Hakansson, Salameh, & Nettelbladt, 2003). Firstly, children

were found not to have language impairment in their L1 and secondly, they have been exposed to L2 (Swedish) for a period of more than a year to 2 years. If language delay or impairment in the primary language is a possible indicator for L-b LD then their language competency levels should be assessed in both languages involved (Hakansson, Salameh, & Nettelbladt, 2003).The typical language system involves a speaker and a listener using verbal or non-verbal modes of communication. The details of the linguistic system including the units of language that are crucial for analysis of learners with L-b LD is illustrated in the following figure 2.6 below.

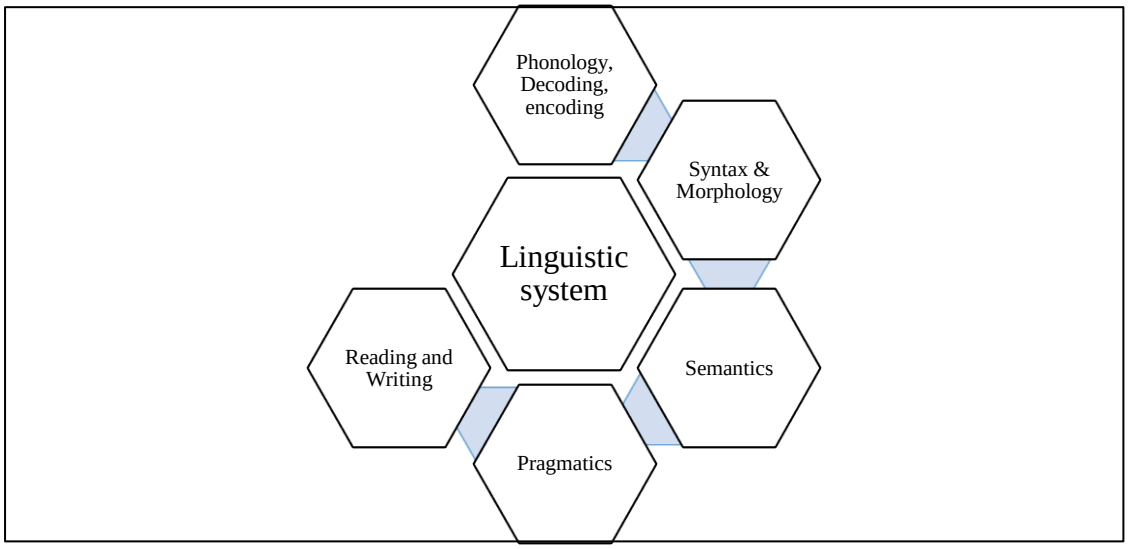


Figure 2.6The Linguistic System for Language-Based Learning Disability

There are two opposing approaches to understanding language impairment in bilingual children which are also relevant for learners with L-b LD in the South African context. The linguistic-based and the processing-based approaches explain the reasons behind the apparent language difficulties. Both these approaches agree that the type of difficulties faced by bilingual children include word finding difficulties, delayed vocabulary development, poor grammar as well as errors in inflection, tense markers and comprehension delays in both languages (Bedore & Pena, 2008, p. 13). Emphasis is placed on dual language assessment so that achievement is indicative of the learner's language of strength and would more accurately identify the nature of the language difficulties when there is L-b LD (Dockrell & Marshall, 2015, p. 118).

While literature suggests that differentiation is made possible by dual language assessment, Parsot (2012) found that SLTs assess learners in special schools in the language of instruction

of the school in which they attend, which in more than 60% of the cases in South Africa, is either English or Afrikaans. Mdlalo *et al.* (2016) also reported that SLTs seem to have pressure from parents and educators to assess learners in their language of learning (English) despite it being the additional language for many learners (Parsot, 2012, p. 85).

Evaluation of isiZulu-English speaking learners with learning difficulties requires application of knowledge about isiZulu pragmatics, semantics, syntax and morphology as displayed in Figure 2.6. The language assessment should acknowledge the structural differences between English and isiZulu particularly the simple vowel structure in isiZulu, the lack of vowel diphthongs, differences in pronunciation of consonants, the lack of the sound R in the isiZulu inventory as well as its different rhyming patterns and tone. Consequently, diagnostic assessment should include a broad range of methods, obtained from multiple sources, relevant for the diverse and evolving population of isiZulu speakers in rural and urban areas (Magagula, 2009).

Dialectal differences are observed throughout South Africa in areas where isiZulu is spoken and within the province of KwaZulu-Natal where it dominates over other languages (Magagula, 2009). The dialectal differences are important to acknowledge even when assessing bilingual isiZulu speaking learners in English. Moreover, code switching between English and isiZulu is very common in townships and urban areas and it affects both the language structure and culture or lifestyle (Magagula, 2009). Children in the 21st century do not speak pure isiZulu anymore; the language is heavily mixed with English, Afrikaans and other languages (Mathonsi, 1994).The basic characteristics of isiZulu that are particularly distinctive to English have been historically documented as follows:

Table 2. 1 IsiZulu Language Characteristics

Category	**Description**
Tone	• IsiZulu has a simple tone system language (Nyembezi , 1992).
Consonants	• IsiZulu has a large consonant inventory while it has only 5 to 6 vowels in its inventory. It has a high consonant–vowel ratio (Nyembezi , 1992). • IsiZulu has all the common consonants and the additional clicks which are classified as uncommon consonants (Poulos & Msimang, 1998). • When compared to English there are no uvular consonants while there

	are glottalised consonants (ejectives and implosives) and lateral consonants Poulos & Msimang, 1998).
Voicing	• IsiZulu has voicing in plosives and fricatives.
Vowels	• The contrast is absent for vowel nasalization in isiZulu (Doke, 1954). • There are no front rounded vowels. The syllable structure is moderately complex when compared to other languages (Poulos & Msimang, 1998).
Nouns	• There are no possessive nouns in isiZulu, thus no possessive classification and absent numeral classifiers (Poulos & Msimang, 1998).
Gender systems	• IsiZulu has non-sex based gender systems, thus systems of gender are formal and semantic as in the Afrikaans language. No use of the equivalent "she" and "he" pronouns (Poulos & Msimang, 1998).
Sentences structure	• The sentence structure tends to be governed by the noun. The grammatical structure generally follows the order of subject-verb-object in sentences, subject-verb or verb-object (Poulos & Msimang, 1998).
Rhyme	• IsiZulu has trochaic rhythm tasks. The rhyme scheme in isiZulu is based on repetition of words and phrases. • The concept of rhyming words is not similar to English. Some describe rhyming in isiZulu as cyclic as it involves anamatopea, tonology, and ideophone and refrain (Makhoba, personal communication, March 16 2015). • IsiZulu language has neither metrical nor a vowel consonant linguistic system that permits rhyming structures in speech and conversation. • The rhyming scheme is different from English as the rapped and dragged phrases can be found at the beginning or the end of a word or in more than one syllable in a word for example umama–unana (Atwell, 2002). • IsiZulu has clear syllabic boundaries (Suzman, 1996). Rime is not salient in Zulu because of the close correspondence between letter-sound mappings in spoken Zulu than in English (Suzman, 1996).
Dialects	There are considerable dialectal variations in isiZulu language involving syntax, morphology and pragmatics (Mathonsi, 1994).

2.8 The System of Culture and Cultural Competency

Culture is a complex concept which has been defined extensively in anthropology, linguistics and education. One of the most extensive definitions is offered by Battle (2000)where she refers to culture as the learned, shared and transmitted knowledge of values, beliefs and lifeways of a particular group that are generally transmitted inter-generationally and influence thinking, decisions and actions in the patterned or in certain ways (Battle, 2000). Culture is difficult to understand especially when related to children, as it is largely unconscious and consists of both implicit and explicit features.

This study considers how assessment for L-b LD can be determined for isiZulu-English bilingual learners in a manner that is culturally appropriate and that acknowledges linguistic diversity. A comparative study of the Renfrew Word Finding Test between South African English and Indian English speakers discovered that even if children were from the same language group and socioeconomic background, cultural differences may still influence their performance on the test (Pahl & Kara, 1992). Consequently, in developing locally relevant data and materials, one needs to fully acknowledge the characteristics of a multilingual society, understanding the impact of the multiple cultures on individuals tested and attitudes, experiences and skills of those testing the learners.

The relationship between language and culture is understood to be intricate in that language gives expression to the cultural concepts and constructs that need to be measured, implying that language is culture bound. Cultures often have diverse linguistic backgrounds that influence children's responses to specific assessment strategies and techniques (Warner, 2004). Comparison of the performance of different language groups, even within the same cultural group, thus leads one to the conclusion that the impact of language on test performance cannot be ignored and cannot solely be explained in terms of cultural differences in cognitive test performance (Foxcroft & Aston, 2006).As culture is dynamic and changes with global phenomenon, Battle (2016) recommends that we should view culture at different levels such as level of behaviour, values and fundamental assumptions of the group.

A well-established approach to adopt for the multicultural and multilingual society is social identity theory which suggests that each individual is influenced by a plethora of cultures and subcultures, some ethnic, some national, some organizational (Tajfel, 1978 cited in Straub, Loch, Evaristo, Karahama, Srite, 2003). The social identity theory suggests that individual's

social identity represents an amalgamation of cultures across boundaries which fuse together to create one's own culture and combinations that is unique to each individual. Viewing culture through this lens prevents categorizing individuals by race, tribe or religion because individuals may not belong to the same culture despite being a member of the same "culture", family or country (Straub, Loch, Evaristo, Karahama, & Srite, 2003).

Culture is shared values which are a relationship among abstract categories that are characterised by strong effective components and imply a preference for a certain type of action (Straub, Loch, Evaristo, Karahama, & Srite, 2003). Different cultural competence frameworks have been developed for relevance to health and social care. These frameworks have a common definition of cultural competence as the ability to work and communicate effectively and appropriately with people from culturally different backgrounds (Battle, 2016; Alizadeh & Chavan 2015; Flack, Pahl & Mdlalo, 2015). Cultural appropriateness implies not violating the valued rules of the society, which automatically implies awareness of such rules and then seeking to understand the individual's interpretation of these rules. Importantly, most cultural competence frameworks acknowledge that competence is an ongoing process which progresses from cultural awareness to cultural knowledge then cultural behaviour and skills.

Research on social attitudes observed that South African culture may have been affected by school integration which began in 1991, shortly after the abolishment of racial segregation. The reports between 2003 and 2010 reflect a change in attitudes towards various issues on integration, race, language and tolerance among South Africans (wa Kivilu, Diko, & Mmotlane, 2010). They report that change in culture and attitudes was not only affected by time and increase in tolerance levels but also by socioeconomic factors. It appears that people from poor social conditions, with low income, low education in both urban and rural settings, mainly Africans, were found to be the majority of people who supported integration and were admissible to change in their own culture (wa Kivilu, Diko, & Mmotlane, 2010).

The South African Social Attitudes Survey reflected that indicators of social cohesion have an impact on social domain and personal wellbeing (Roberts, wa Kivilu, & Davids, 2010). Thus, elements such as financial security, achievements in life, safety, standards of living, health and personal relationships have an influence on language (Roberts, wa Kivilu, & Davids, 2010). It is deduced that if there is less social cohesion, there would be less structure

and uniformity in language and culture (Roberts, wa Kivilu, & Davids, 2010). It also follows when assessing language of English L2 learners, it would be unfair to expect them to have a cultural insight into that language (Kearney, 2010). An interesting observation is that in education, particularly in language learning, the concept of language and culture being inextricably intertwined is certainly questionable (Kearney, 2010). In teaching language, the 5th element of language which is culture, is often neglected in favour of the other four, namely speaking, listening, reading and writing. Furthermore, Kearney (2010) observed that linguistic and cultural forms are divorced in modern learning. The challenge of integrating language and culture in learning is significant when assessment is introduced as it is then expected that knowledge of culture be considered as a factor.

This study takes the position that some historical differences between South African English and isiZulu cultures involving children are still relevant in the present day. Some of these cultural behaviours are Ancestoral belief, use of traditional healing, Zulu family concept and Zulu folklore (Singh & Rampesad, 2010). Many modern Zulu people are Christians but they have not neglected their beliefs in ancestors and the power of the Ancestoral spirits in the families. There is a mixture of traditional and Christian beliefs which influence how people interpret negative things that happen in their lives including diagnosis with illness. Offerings and sacrifices are made to the ancestors for good luck, health and protection (Singh & Rampesad, 2010). The use of traditional healing is still a significant influence on many modern Zulu families. A traditional healer is usually sought when bad luck has struck the family and when such negative occurrences such as developmental delay in children occur. There are a number of events that should happen when a child is born including acknowledgement of the birth, healing the baby and prevention of illnesses. The use of herbs and skin scarring or nipping of the little finger are some of the processes involved in such healing (Singh & Rampesad, 2010).

Zulu folklore is transmitted through storytelling, praise poems and proverbs, these explain Zulu history and teach moral lessons. Singing and dancing are part of a popular culture, in modern families this may include listening and singing local kwaito music or isiZulu rap or hip hop versions (Singh & Rampesad, 2010). The isiZulu term for family includes all the people staying in that family including people who may not be directly related to the family, those who are adopted and those known through friendship or share the same surname. These family bonds are stronger in rural areas than urban areas (Singh & Rampesad, 2010). Other

communication styles to observe for include differences in signs, gestures, body language and customs.

This research aimed for cultural sensitivity yet, for cultural appropriateness to be achieved, accounting for specific cultural differences is necessary. Bearing this in mind, the different levels of culture as laid out by (Battle, 2000) was adopted in this research project. It recognized the national culture of being South African, the ethnic culture of being African, ethnic and linguistic culture of speaking isiZulu. Further group cultural styles, not necessarily for Zulu people but for different communities need to be acknowledged and that these cultural styles may be different in various communities. The implication of this approach to research and clinical language assessment is that the assessor needs to determine salient cultures for each individual, observing the learner's immediate family background, their school, social environment and community shared values relating to children (Battle, 2016). Shared values would be easier to identify since values are acquired early in life, through family, neighbourhood and school. These values can be treated as variables in positivist research where there could be comparisons and contrasting of these events (Bedore & Pena, 2008). Culture then is measured at an individual level even though it is a phenomenon that occurs in a group level (Battle, 2016). Culture should be considered a variable similar to age or gender that can be crucial in defining the manner in which higher cognitive factors such as language are related to brain organisation.

2.9 Language Assessment Approach

There are conceptual, linguistic and cultural foundational knowledge that play a role and necessary for practitioners and researchers to understand in order to assess ESL learners (Brea-Spahn, 2014, p. 3). The education, linguistic, cultural systems as well as neurological indicators of Lb LD facilitate the identification of this knowledge for learners with L-b Ld. These systems are also referred to "*circles of knowledge"* (Brea-Spahn, 2014, p. 3). This knowledge assists in determining which languages to assess and help to determine the impact of context on the language used and compares collected data to appropriate standards. Thus, information obtained from each system can contribute towards both assessment and intervention. The profiles are determined through acquiring knowledge about different systems which interact for a learner with L-b LD (Brea-Spahn, 2014). The following Figure 2.7 depicts a model for differential assessment for language based learning disabilities.

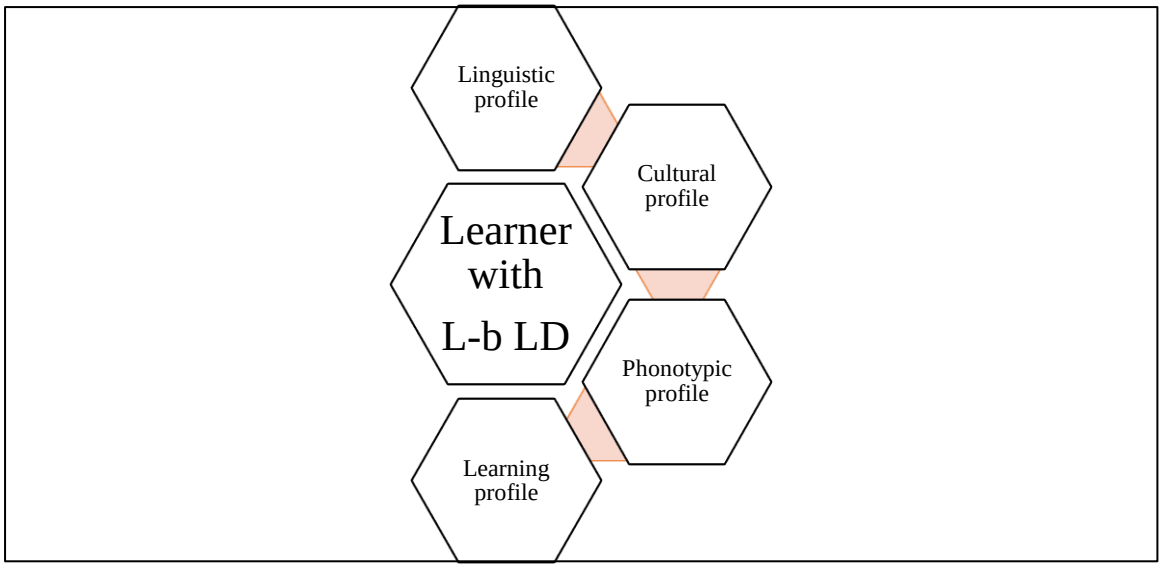


Figure 2.7 Language-Based Learning Disability System

Figure 2.7 summarizes the components of a system for L-b LD. The linguistic profile determines details about the learner's vocabulary and metalinguistic. It determines past experiences and future needs for language (Brea-Spahn, 2014). The communication pathology system links information about the phonotypic profile of the learner. It determines how the learner's two languages interact, how language use is characterised by individual variation and how knowledge distribution occurs between L1 and L2. The cultural profile inform of the learner's values, beliefs and symbols (Brea-Spahn, 2014, p. 10). The method of using profiles and considering different systems is in line with the multidimensional view for differentiation of speech and language disorders (Lombardino, 2012). Assessment of children in a linguistically and culturally diverse environments demand culturally sensitivity and this culturally sensitivity needs to be reflected through awareness of views, prevention of bias and prejudice in at least three areas i.e. the tester, the test materials and methods as well as the testing environment (De Lamo White & Jin, 2011).

2.9.1 The Tester

The implicit cultural variables include religious practices and beliefs, spiritual beliefs, educational values, age and gender roles, child-rearing practices, and fears and perceptions are very critical in language development and assessment (Battle, 2012). A culturally competent SLT is encouraged to move away from ethnocentrism, the belief that one's way of life and view of the world are inherently superior to others and more desirable. As such, their clinical practice would focus on beliefs about groups instead of individuals (American

Speech-Language Hearing Association , 1993). Instead, the culturally competent SLTs and Educators must recognize that differences do not imply deficiencies or disorders.

Furthermore, Flack, Pahl, & Mdlalo (2015, p. 97) caution SLTs to be aware of the power SLT's have by virtue of their position or role in assessment as this power gives them hegemony over knowledge she gained from the assessment. In a similar manner culture and language may influence the behaviours of tested individuals and their attitudes toward speech, language, and hearing services and providers. Cultural and linguistic competence is as important to successful provision of services as are scientific, technical, and clinical knowledge and skills (Battle, 2012).

2.9.2 The Test Material and Methods

The principles of universal language assessment state that the tool needs to fulfil the following:

- Inclusivity: Guidelines on inclusivity of an assessment tool stipulate that a tool needs to include all possible candidates for that assessment. The principle of fairness plays a significant role in inclusivity as it means absence of bias, equal opportunities, equitable treatment (Kunnan, 2014, p. 2).
- Fairness: The test fairness framework developed by Kunnan (2014) defines test fairness as free from bias in dialect, content and topic as well as in group performance.
- Testing accommodations: These are changes in assessment materials or procedures that address aspects of students' disabilities that may interfere with demonstration of their knowledge and skills (Bolt & Thurlow, 2004, p. 3). Accommodations provides better measurement of knowledge and skills of ESL learners and need to be modulated according to set standard guidelines (Sireci, Han, & Wells, 2008, p. 117). Although there is evidence to suggest that these modifications interfere with the constructs assessed, it is important to note when such accommodations are used (Sireci, Han, & Wells, 2008, p. 112). Universally designed tests need to minimise accommodations, it is still valid to allow for it in this young stage of developing original South African tests (Johnstone, Altman, Thurlow, & Thompson, 2006, p. 16).

- Simplicity, clarity and comprehensibility: Dockrell and Marshal (2015) state that because language is dynamic even minor problems can affect the learner's ability to access the curriculum (Dockrell & Marshal, 2015, p. 117). The language and content should be simple and clear.
- Readability is defined as a measure of understanding written information (Ley & Florio, 1996, 2007, p. 7). Monitoring item length, avoiding words with dual meanings and use of high frequency vocabulary were some of the considerations made for readability in the blueprint (Dempster & Reddy, 2007, p. 910).
- Legibility is reflected by how illustrations and response format have the capability of being deciphered with ease (Johnstone, Altman, Thurlow, & Thompson, 2006).
- Regarding language of testing, the recommendation for bilingual children is that assessment should be conducted in both their first language (L1) and in English (Naude', Louwe, & Weideman, 2007). This is currently the accepted standard of practise in the discipline of communication pathology and adopted in this study in order to facilitate culturally sensitive diagnostic assessment because language development is not linear but dynamic and interconnected to other variables (Cummins, 2008, p. 64).

Recommendations for optimum cultural considerations in research and in testing situations include the use of a dynamic assessment approach which involves teaching then testing in order to overcome the bias from lack of familiarity with assessment requirements. For optimum cultural sensitivity results, it is essential that tools are developed in conjunction with mother-tongue speakers of the language involved (Holding, Abubakar, & Kitsao-Wekulo, 2010). Piloting on a representative sample taking into account the ages, sex and socio-economic status as well as schooling status of the children is a crucial part of development

2.9.3 The Test Context

There are a number of contextual factors that have an impact on students' performance in tests. These include familiarity with the testing environment, pragmatic bias, picture recognition, cognitive fatigue, and test timing. Research encourages that children be tested in their familiar environment instead of a clinical setting away from their homes or school (Carter, Lees, Murira, Gona, Neville & Newton, 2005). Pragmatic bias may surface if conversational and discourse rules are not considered during clinical and research assessment These include turn taking during conversation, interruptions, silence, appropriate topics of

conversation use of humour, appropriate amount of speech, how to open and close a conversation and nonverbal strategies such as eye contact (Carter, Lees, Murira, Gona, & Neville, 2005).

Picture recognition is perceived differently by typically western or English children compared to African or rural children who are used to listening to stories and use imagery and voice to distinguish between characters Carter *et al.* (2005). Therefore all pictures should be piloted to ensure the appropriateness of images, colours, structures and clarity. Cognitive fatigue influences students' performance. Testing at a later time of day was found to have a negative effect on scores in Danish public schools (Sievertsen & Gino, 2016). Test timing is another important consideration as interpretation of speed or pace may differ from one environment to another (Carter, Lees, Murira, Gona, & Neville, 2005).

2.10 Conclusion

The importance of defining the term learning disability clearly and conceptually has been emphasised in this chapter. In South Africa the broad term "*barriers to learning*" often refers to learners with language-based learning disabilities. The prevalence of L-b LD is unclear in South Africa due to lack of nationally accepted definitions across the health and education spectrum and due to the interplay between intrinsic and extrinsic factors that result to language-based learning disabilities. The multiple systems which impact on the learner with L-b LD and his or her success in education were discussed in this chapter. These include neuro-psycho-social, linguistic, cultural and the education system. The SLTs must also change their focus of intervention from impairment which is problem centred, to participation which is learner centred. Language assessment should consider the profiles contributed by all the systems to lead to relevant curriculum planning and differentiation. Culturally appropriate assessment tools consider each learner as an individual, in the context of his or her social, economic and educational environment, their family and their community. The following chapter 3 will expand on the systems introduced in this chapter to expose the theoretical framework used in this study.

CHAPTER 3

THEORETICAL FRAMEWORK

3.1 Introduction

This study is framed within an ecological approach to L-b LD introduced in chapter 2. This framework was applied in the design of the study and in the development of the language assessment tool. The way learning is defined and understood has implications for how learning skills are assessed and how changes in learners are facilitated (Ertmer & Newby, 2013). The combination of systems theory and theories of learning inspired the framework for the development of the bilingual battery for language-based learning disability (L-b LD).

3.2 Ecological Approach to Theoretical Framework

The bioecological approach encompasses various systems that govern the lifelong course of human development in the actual environment in which the human being lives (Bronfenbrenner, 1994). This approach emphasises the interaction between the process of learner development, the person or the learner in this context, the context in which the learner develops as well as the essential element of time (Bronfenbrenner & Morris, 2007, p. 795). For application to L-b LD, the learning process interacts with the learner's a) neuro-psychological factors, b) social context, c) linguistic environment, which may be multilingual and multicultural, as well as d) the diverse educational factors. These were introduced in chapter 2 as microsystems that exist in the learner's environment.

Five systems were identified to be applicable L-b LD in chapter 2 of this report. The neuro-physiological and psychosocial support system identifies factors related to the learners, health, cognitive development, physiological early indicators that detect L-b LD. The language and culture systems identify significant factors for bilingual learners who speak isiZulu as their home language. It identifies cultural components that are important to consider for the development of a culturally sensitive language assessment tool. The education system is crucial to discuss as South African education is inclusive and promotes a tendency towards an ecological approach (Micanovic`, Novovic`, & Maslovaric`, 2017). The communication (speech and language) system facilitates differentiation between L-b LD and other language or learning conditions. Normal language skills facilitate good development of

reading and writing hence, there is a close relationship between literacy and language (Walsh, 2009, p. 67).

The five systems earlier identified interact to form the learner's mesosystem. The mesosystem is reflected in the following figure 3.1 as the outer circle around the microsystems. The learner's immediate environments of home, school and his community form the learner's microsystem. A microsystem is defined as a pattern of activities, social roles and interpersonal relations experienced by the developing individual in a face to face or direct interaction with physical, social and symbolic features in the immediate environment (Bronfenbrenner, 1994, p. 39). The mesosystem comprises the linkages and processes taking place between two or more settings containing the developing person for example, the interaction between the community and the school (Bronfenbrenner, 1994, p. 40)

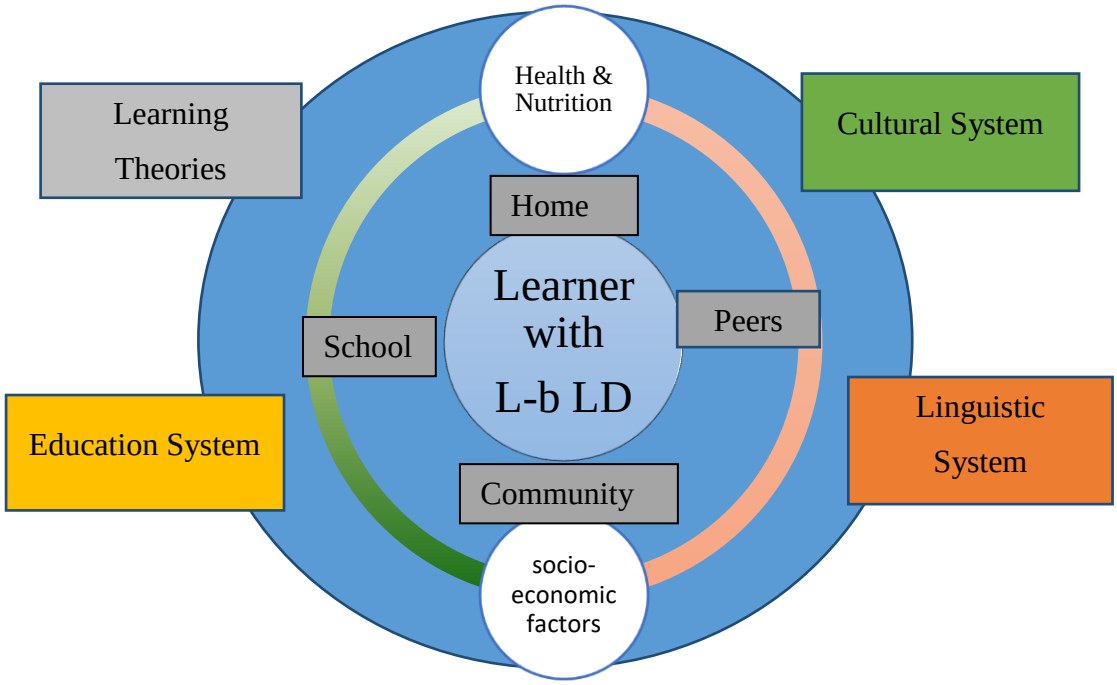


Figure 3. 1 The Ecological Systems of Language-based Learning Disability

This research project aimed to probe into the influence of linguistic, cultural and educational macro systems on learning and L-b LD for the South African context. The conceptual definitions of L-b LD, introduced in chapter 2, emphasise that there is no direct association between multilingualism and L-b LD. Nonetheless, learners who are ESL are likely to be misdiagnosed with L-b LD (National Center for Learning Disabilities, 2013). Clinicians are also discouraged to label a learner presenting with expected patterns of second language

acquisition as deficient (National Joint Committee on Learning Disabilities, 2007). The relationship between contextual factors and L-b LD has been established (Schulze & Van Heerden, 2015). However, the nature and extent of the contribution of contextual, cultural and linguistic factors to L-b LD is unclear for South African learners. The knowledge of broad elements that contribute to Lb LD would eventually predict the profile of learners with L-b LD. Since it has been established that the majority of speech language therapy caseloads are ESL learners, the theoretical framework should help to accurately identify and assess ESL learners with L-b LD (Flack, Pahl, & Mdlalo, 2015).

The ecological approach, based on systems theory, assists to understand L-b LD for bilingual isiZulu-English learners in the South African context. The ecological approach shifts the perception that it is the learner that has a problem, to one that considers the barriers that the learner encounters in different spheres of life, such as the family or school environments (Bronfenbrenner, 1994). This is the foundation of the White Paper 6 and corresponds with the inclusive education policy as well as available research (Geldenhuys & Wever, 2013; Engelbrecht, Nel, Nel & Tlale, 2015, p. 6).

3.3 Learning Theories

Learning is defined *as "an enduring change in behaviour or in the capacity to behave in a given fashion, which results from practice or other forms of experiences"* (Schunk, 2012, p. 3). Learning is a complicated process which involves acquiring and modifying knowledge, skills, strategies, beliefs, attitudes and behaviours (Schunk, 2012, p. 4). Human learning is different from animal learning because it involves language. For this reason, learning is observed and assessed based on what people say, write and do (Schunk, 2012, p. 4). Theories of learning provide empirically based accounts of the variables which influence the learning process and provide explanations of the ways in which that influence occurs (Mayes & De Freitas, 2007, p. 5). In general, learning theories agree that language plays a critical role as a tool for learning other skills. Commonly, learning theories assert that the ontogenesis of language and learning are similar. Most learning theories assume the principle that children progress through stages and that learning materials should be introduced in incremental steps. Learning theories also agree that motivational and social factors influence learning (Schunk, 2012). The following discussion of learning theories will summarise the key theories that are relevant for learning and speech language therapy assessment.

3.3.1 Behaviourism and Cognitivism

Historically, there are two major schools of thought regarding learning, the first one views it as a process and the second one as a product. Theories associated with behaviourism generally refer to learning as a change in behaviour thereby a product. They consider permanent changes in behaviour or the potential for change as a result of experiences. The behaviourist school of psychology founded by Skinner and Laird (1985) and supported by Burns (1995) constructed a number of conditioning theories which explain learning in terms of environmental events (Schunk, 2012, p. 102). Examples of behaviourism theories that influence learning are: the reinforcement theory which suggests that positive or negative reinforcement facilitates learning as a desired behaviour. It also include the facilitation theory, which refers to the educator as a facilitator who establishes an atmosphere in which learning occurs. Kolb's (1984) experiential learning theory, which proposed a four stage learning process where concrete experience is a basis of reflection, observation and experimentation (McLeod, 2013). Action learning theory links the world of learning with the world of action through a reflective process within small cooperative learning groups known as action learning sets (Mayes & De Freitas, 2007).

Generally, the behaviourists view of learning as a change in rate, frequency of occurrence and form of behaviour as a result of a stimuli (Schunk, 2012, p. 19). The behaviourism approach to learning and teaching relates to learning time, behavioural objectives, mastery learning, and programmed instruction. The implication of behavioural theories on speech and language therapy assessment is that learning requires establishing a response to stimuli. It also implies that practice is needed to strengthen responses. It suggests that instructions should be clear, objectives must be measureable and that reinforcement promotes learning (Schunk, 2012, p. 115) .

Contrary to the view of learning as a product, the cognitive theories such as the Cognitive-Gestalt approach, the holistic learning theory and the Marxist theoretical framework, view learning as a process and involving complex cognitive processes (Ertmer & Newby, 2013, p. 50). Cognitivists consider that not all changes in behaviour result from learning experiences. They see learning as not external to the learner but as personal, involving processes such as thinking, problem solving, language, concept formation (Ertmer & Newby, 2013). The Cognitive-Gestalt theory considers personality, intellect, emotions, impulses, intuition and

imagination as elements of effective learning. In the cognitive perspective, memory has a significant role to play in learning (Schunk, 2012, p. 23)

3.3.2 Socio-Cultural Theory

The major elements of Vygotsky's view to learning that are relevant for speech and language therapy assessment are maturation, practical intelligence, speech and language, and potential to learn. The central tenet of the socio-cultural theory of higher mental processes is that all phenomena must be studied as processes in motion and in change (Vygotsky, 1978, p. 6). Vygotsky suggests that qualitative changes in behaviour occur in the course of development. Thus, he maintained his approach to be developmental (Vygotsky, 1978, p. 7). He also asserts that the mechanism of individual development is rooted in society and culture. It means that culture, social and physical environment, influences the development and learning process.

The theoretical position on the relation between learning and development, is that learning begins before children start school (Vygotsky, 1978, p. 85). Therefore, learning and assessments should be matched with the child's developmental level. The more demanding the operation, the greater the importance of speech in the operation as a whole (Vygotsky, 1978, p. 26). Therefore, speech and language plays a vital role in the learning process as it becomes the method of learning as well. Language plays both an intrapersonal function which means that it facilitates learning by shaping activity into structure while it plays its interpersonal use in communicating with others (Vygotsky, 1978, p. 27). Vygotsky regarded the converging of adaptive behaviour and speech as the most significant moment in the development of a child (Vygotsky, 1978, p. 24).

The potential to learn is viewed as a reflector of the child's own mental development. Vygotsky called on thinkers to recognise that what a child can do with assistance of others might be more indicative of their mental development than what they can do on their own. The zone of proximal development defines those functions that have not yet matured but are in the process of maturation. Therefore, a language assessment tool design needs to incorporate teaching and trial opportunities in isiZulu and English to allow for measurement of the zone of proximal development.

The socio-cultural theory of learning is one of the frameworks that is applied to understand bilingual language acquisition and L2 teaching (Aimin, 2013). It has informed the education field of teaching methods that can be achieved through the lens of a potential to learn (Turuk,

2008, p. 244). Although socio-cultural theory is concerned with how individuals acquire their narrative language, its emphasis on the social and cultural contexts has been used to justify collaborative methods when teaching bilingual children (Aimin, 2013). Teaching strategies such as scaffolding, mediation and internalisation have been founded on the sociocultural theory (Aimin, 2013). Thus it has become one of the key approaches to consider when working with L2 children in particular.

3.3.3 Language-Based Theory of Learning

The language-based theory of learning is based on Halliday's ideas on personal experience and observations as a linguist and indirectly expanded on Vygotsky's ideas from the socio-cultural theory perspectives Halliday (1993, p. 93). Halliday emphasised that language development is not just one learning domain. He viewed language *"as the essential condition of knowing, the process by which experience become knowledge"* (Halliday, 1993, p. 94). In his introduction of the language-based theory, Halliday details the various stages of language learning that is parallel to learning. He views learning as a process of making meaning. Therefore, language is the process by which experience becomes knowledge (Halliday, 1993, p. 94). Halliday suggests 21 features which are stages of language and learning development. The stages start from the recording of symbolic acts to the use of grammar, information, discourse and literacy which are helpful in mapping the development of different meanings including the written mode. Halliday's proposal emphasizes the process of language learning and may have neglected how learning occurs through language. This neglect is highlighted by Wells, who also notes the complimentary nature of the language based learning theory to Vygotsky's theories (Wells, 1994, p. 42).

Wells observed that Vygotsky and Halliday are in accord regarding the general concepts involved in learning a first language (Wells, 1994, p. 51). Vygotsky and Halliday share the idea that in any domain, the present state can be understood by studying the stages of development that preceded it (Wells, 1994). The foundation of the language based learning theory include actual features of language which helps users to assess where a learner is in the continuum of learning. It does not serve to evaluate whether he or she is behind or in line with development of others but more specifically where he or she is in the process of their own development (Wells, 1994). This concept is similar to what Vygotsky refers to as the zone of proximal development. Halliday suggests what sounds like support for the socio-

cultural theory when he states that theory should not dissociate the system from the instance and competence from performance (Halliday, 1993).

Halliday proposes an alternative to Vygotsky's experiments and self -regulation. Halliday proposed that theory should be based on natural data, unconscious language, in context and not self-monitored (Halliday, 1993). The dynamic view of learning reflects that the ability to learn fluctuates over time, dependant on differential development of particular skills and mechanisms and the effects they have over each other (Rochat, Mitchel, & Richter, 2008, p. 19). The stages of speech and language development are relevant to tool development as the tool needed to reflect the stage of the learner's development.

Human learning is viewed as a semiotic process, meaning, it is a process of making meaning (Halliday, 1993, p. 93). The proponent of the language-based theory of learning states that, *"when children learn language, they are not simply engaged in one kind of learning among many, rather, they are learning the foundations of learning itself."* (Halliday, 1993, p. 93). Language is relevant to both verbal and non-verbal skills as one can encode all experiences in semiotic terms (Halliday, 1993). Both the language-based learning theory and the socio-cultural theory proposes that it is through participation in the context of everyday events and activities that the child's learning of and through language takes place (Wells, 1994). They both treat language as a system, resource, code and behaviour (Wells, 1994). They also relate in assumption that cultural practices leads to modification and transformation of the individual's human natural functions (Wells, 1994).

The implication of this theory for literacy is that language learning is connected to reading. It also highlights that various aspects of reading involve many brain structures and synoptic connections that must be coordinated to successfully read (Schunk, 2012, p. 50). The implication for speech and language therapy assessment is that children acquire phonemes that they are exposed to them in their environments. Children may be prewired to accumulate language features, but if the environment does not provide the input they will not learn. Language-based theory of learning reflects the interaction between hereditary and environmental factors. Moreover, it infers that language acquisition coordinates functions of vision, hearing, speech and thinking. (Schunk, 2012, p. 56).

3.3.4 Neurological Theory of Learning

Luria's neurological theory is relevant for L-b LD as it explains the higher mental functions required for learning (Luria & Haigh, 2012). A neurophysiological perspective is critical to consider when assessing learners with learning disabilities because according to the latest definition of L-b LD in the DSM V, L-b LD is believed to have a neurological basis (Scanlon, 2013). Luria's neurological theory is based on Vygotsky's (1960) hypothesis that

"*Higher mental functions may exist only as a result of interaction between the highly differentiated brain structures and that individually these structures make their own specific contributions to the dynamic whole and play their own roles in the functional system"* (Vygotsky, 1978)

Luria confirmed that higher mental functions are complex and have a wide, dynamic representation throughout the cortex (Luria & Haigh, 2012). Luria determined that higher mental functions actually develop on the basis of speech and language. Speech and language systems are critical components of higher mental functions as initially suggested by Vygotsky. These complex functional systems are not mature or complete at birth and do not mature independently (Luria & Haigh, 2012). However, they are formed in the process of social contact and objective activity by the child. Therefore, Luria corroborates Vygotsky's argument in that there are successive stages of development and the structure of the higher mental functions does not remain constant (Luria & Haigh, 2012). The relevance of Luria's neurological theory on learning is based on his conviction that

> "*In order to explain the highly complex forms of human consciousness one must go beyond the human organism. One must seek the origins of conscious activity and categorical behaviour not in the recess of the human brain or in the depths of the spirit, but in the external conditions of life. Above all, this means one must seek the origins in the external processes of life, in the social and historical forms of human existence"* (Luria, 1973, p. 25).

It is interesting that Luria views the neurological perspective as not sufficient to explain human behaviour and learning. Vygotsky expressed that cultural experiences are not independent of the organism. The implication of this theory for literacy is that there is interaction of the internal and external factors. It also implies that learning involves forming and strengthening neural connections and networks. The application for speech and language

assessment is based on the premise that neurophysiology explains how short term, working memory and long term memory contribute to information processing and learning (Segalowitz & Gruber, 2014). It also imply that visual and auditory stimuli are important for learning and should be considered for assessment in L-b LD. It emphasises that repetition strengthens neural connections and facilitates learning. There is integration of experiences from one's own mental activities and the environment (Schunk, 2012).

3.4 Theoretical Framework

Language-based learning disabilities in South Africa are understood in the context of the White Paper 6 and inclusive education policy which are both founded in universal design for learning based on Vygotski's socio-cultural theory of learning (Nel & Grosser, 2016, p. 2). The socio-cultural theory explains the key cognitive skills, language development and contextual factors that are critical to learning both the first and the second languages. The ecological and learning theories jointly contributed assessment principles that were applied in this study for language assessment related to learning skills and to L-b LD. The principles are as follows:

a. Language is a key tool and means of learning.
b. Neurological networks facilitate language development, reading, spelling, numeracy.
c. There needs to be stimuli appealing to varying senses in order to probe for responses to what has been learnt.
d. Practice is needed to strengthen responses.
e. Instructions should be clear.
f. Assessment objectives must be measureable.
g. Assessment should appeal to the need for reinforcement.
h. Assessment should involve varying processing skills including thinking, problem solving, language, concept formation.
i. Assessment should follow the principles of dynamic assessment.
j. Assessment should be considerate of the learner's culture and environment considering the learner's environment.
k. Assessment should acknowledge developmental stages and maturation.
l. Assessment should include evaluation of language processing skills including how short term, working memory and long term memory.

The following Figure 3.2 illustrates an interpretation of the dynamic nature of the learning and language assessment processes. Figure 3.2 expands on the understanding of the systems that impact on the learner with L-b LD earlier introduced. It integrates these systems with learning theories. It illustrates that the building blocks that are relevant for language development and learning are contained within the learner's microsystem. These include the learner's core cognitive and language skills identified through the L-b LD indicators. The fundamental elements that affects learning such as family or home, school and community form the learner's mesosystem. There is interaction of the various systems in the learner's macrosystem. Political, economic, social and natural changes that occur over time have an effect on all systems and referred to as the chronosystem.

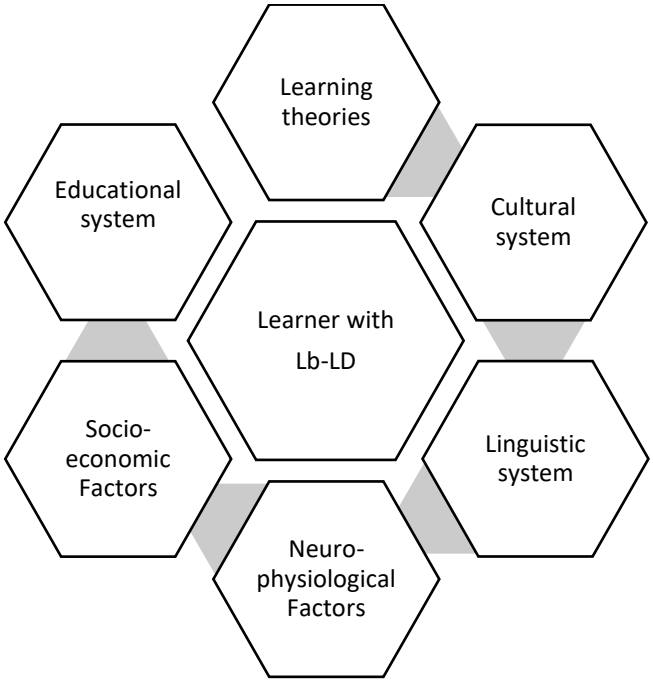


Figure 3. 2 Theoretical Framework for Language-based Learning Disabilities

The application of the ecological approach to the design of a language assessment tool for L-b LD is that assessment should enable the link between the learner and his or her immediate environment, the belief systems that affect them as well as the educational and other policies that guide both assessment and intervention.Therefore, the positions adopted in this study are as follows:

a) Language delay, language impairment or language difficulty should not be disregarded in defining language-based learning disabilities for South African learners.

b) The impact of contextual factors on L-b LD may be causative and not just influential for South African learners.
c) The manifestations of non-specific L-b LD related to contextual factors may be similar to the presentation of verbal type of L-b LD.

The rationale for selection of this framework is that a culturally and linguistically appropriate language assessment tool should evaluate contextual factors which include socio-economic factors, classroom, systemic and cultural factors that may contribute to L-b LD. The acknowledgement of ecological factors should be balanced with impairment identification in the areas of speech and language. The data from the home, school and other environments provide input for academic and therapeutic intervention. The results from such a holistic assessment allows for planning of relevant and contextually appropriate intervention and re-evaluation as the learner progresses over time.

3.5 Conclusion

Learning theories provide a means of understanding the learning process and how it can be approached for adequate assessment of L-b LD. Language assessment for L-b LD should take account of cognitive functionality, the contextual and cultural factors, the stages of development, the learner's potential when stimulated and participation of the individual in all systems over time. Hence, the integration of the systems approach and the theories of learning discussed here. The following methodology chapter will describe the methods that guided the research project and the design of the assessment tool. The methodological design for each of the three phases of the study will be explained.

CHAPTER 4

RESEARCH DESIGN AND METHODS

4.1 Introduction

This research study adopted a pragmatic philosophy to research, thereby viewing the nature of reality to be external to the researcher and multiple views were chosen to answer the research questions (Saunders, Lewis, & Thornhill, 2009, p. 106). The initial proposal was to complete the research in two phases. However, upon experiencing the research process, it became apparent that each stage in phase 1 was a complete and separate phase. Thus, this study was conducted in three phases where the first phase focused on identifying components of existing tools that are relevant for language-based learning disability (L-b LD) and for bilingual isiZulu-English learners in South Africa. The second phase involved identifying indicators of L-b LD and using them to develop a new tool. Considerations for its content, structure, language and cultural components were also made in phase two. The third phase involved tool trials, reliability testing and validation. This chapter outlines the research design, methods and outcomes for each phase and reports on methodological adaptations that had to be implemented in this research. This chapter is divided into two sections in order to clarify methodology for the study (Section A) and methodology used in tool development (Section B).

4.2 Review of Research Methodology

The aim of the study was to develop and validate a sensitive, linguistically, and culturally appropriate assessment tool to detect and evaluate language learning disorders in grade 1, 2 and 3, isiZulu-English speaking learners. The design of the study employed a combination of qualitative and quantitative approaches using descriptive and quasi-experimental strategies as this would best facilitate the achievement of the objectives of the study. For easy referencing the following Table 4.1 aligns the research objectives with the methodology. Mixed methods research is defined as the class of research where the researcher mixes or combines qualitative and quantitative research techniques, methods, concepts or language into a single study (Teddlie & Tashakkori, 2012).

Table 4. 1 Objectives and Methodology

Aim		**Objectives**	**Method**	**Results**
Phase 1: Identify indicators	1	To identify the components of existing tools that could be culturally appropriate for bilingual isiZulu-English speaking learners in grades 1, 2 and3.	Pre-testing of existing tools through adapted assessment in English and analysis of 6-12 isiZulu speaking learners. Minimum 2 learners in each grade.	Components of existing tools that are linguistically adaptable and culturally appropriate for isiZulu speaking learners will be identified.
	2	To identify early indicators of L-b LD and evaluate their relevance and application to isiZulu speaking learners;	Systematic literature reviews.	Early indicators of L-b LD identified and evaluated for their relevance and application to isiZulu speaking learners;
Phase 2 : Develop a test	3	To develop culturally and linguistically appropriate component for the tool (tool constructs and items).	Consult with experts in the isiZulu language, culture, test development and psychometrics.	Culturally and linguistically appropriate tool components are developed (items).
	4	To develop an isiZulu-English assessment tool that is linguistically, culturally and theoretically sensitive to diagnose L-b LD (design and administration)	Delphi technique with the panel of experts in formal testing and language assessment.	An assessment tool is developed that is linguistically, culturally and theoretically sensitive to diagnose L-b LD in bilingual speakers of isiZulu and English.
	5	To pilot and modify the tool for cultural and linguistic appropriateness for learners.	Pilot assessment on a representative sample of isiZulu learners in grade 1-3. Continuous adaptation of the tool. Parent and teacher questionnaires to provide for contextual and socio-economic information.	The tool is piloted and adapted for cultural and linguistic appropriateness in different linguistic environments.
Phase 3: Test for validity and reliability	6	To validate the cultural, linguistic, administrative and content elements of the diagnostic tool.	Statistical methods; focus group discussion by clinicians and educators; Delphi technique with the panel of experts.	The cultural, linguistic, administrative and content elements of the diagnostic tool are validated;
	7	To determine the reliability of the findings.	Statistical methods: clinical evaluation; retest on some of the learners already involved in the study.	The reliability of the findings for bilingual learners in grades 1, 2 and 3 is determined.

Multiple strategies or triangulation in this study served the purpose of identifying L-b LD indicators in current practice, through an expert review using the Delphi technique and through literature review. Triangulation is a social science methodology and is also a research design in mixed method research (Ngulube & Ngulube, 2015). Using a mixed method approach allows for both deductive reasoning and induction in the discovery, exploration, data collection and analysis (Johnson, Turner, & Onwuegbuzie, 2007). The Delphi method is a structured communication technique originally developed as a systematic, interactive forecasting method which relies on a panel of experts to generate information in greater abundance and specificity (Hsu & Sandford, 2012, p. 1).

Method and data source triangulation was used to develop a comprehensive understanding of a phenomena (Carter, Bryant-Lukosius, & DiCenso, 2014, p. 545). Different methods were used for different purposes such as induction or discovery of patterns in systematic literature review for identification of L-b LD indicators, pre-testing L-b LD indicators and piloting the data collection tools. Deduction and testing of hypothesis was used in Delphi panel reviews and in the tool development phase. Abduction or uncovering the best set of available information for understanding one's results, was achieved using statistical analysis (Saunders, Lewis, & Thornhill, 2009, p. 107).

SECTION A: STUDY METHODOLOGY

4.3 Phase 1: Conceptual Development

4.3.1 Phase 1 Research Design

Phase 1's objectives relate to identifying L-b LD indicators and testing their applicability to the South African bilingual isiZulu-English learner. This phase was qualitative in nature and adopted a descriptive design as it allowed for discovery and exploration of available sources

as well as hypothesis or theory generation (Johnson & Onwuegbuzie, 2004, p. 18). The rationale for the descriptive design was to create a profile of L-b LD indicators extrapolated from available research. It was necessary to initiate the research process with this descriptive analysis in order to provide a clear picture of the phenomenon under study (Saunders, Lewis, & Thornhill, 2009, p. 108).

4.3.2 Systematic Literature Review

A critical literature review was necessary in order to develop a thorough understanding of the concepts and research in the area of L-b LD. The literature review followed a simple structure of identifying keywords and starting an internet search for documents relating to these keywords from general to specific concepts guided by the research questions (Saunders, Lewis, & Thornhill, 2009, p. 61). Primary sources were journal articles and books on the topic of specific learning disability in international resources. Literature search strategies included using the university off campus journal library portal; following references from the articles read and scanning though secondary literature in the internet (Saunders, Lewis, & Thornhill, 2009, p. 63). The identified resources yielded notes which led to formulation of profiles. The recommendations were summarised into tables guided by the research questions.

4.3.3 Sampling of Pre-test Candidates

A non-probability, purposive sampling method was used to select pre-test participants. Purposive sampling is described as a sampling process in which researchers choose participants arbitrarily for their unique characteristics or experiences (Schindler & Cooper, 2011). This method was preferred because it allows for particular persons, settings, or events to be deliberately selected for the important information they can provide that cannot be found from other choices (Teddlie & Yu, 2007, p. 8). Although purposive sampling can be

criticised for lack of representativeness and generalizability, it is appropriate for this study as the nature of results are expected to be relevant only for the target population and should not be applied to other language groups or contexts (Saunders, Lewis, & Thornhill, 2009, p. 233). The distribution of the population and sample was as follows:

Pretesting study population: Bilingual isiZulu-English learners in grade 1-3 identified as presenting with L-b LD.

Pretesting sample frame: The accessible sample of isiZulu-English speaking learners, in grade 1 to 3, in a school in the northern coastal region of kwaZulu-Natal.

Pretesting sample unit: 10 learners, 5 males and 5 female learners in grade 1, 2 and 3.

4.3.4 Phase 1 Sources of Data

The researcher was the instrument for data collection in the phase 1 pretesting activity and the literature review. The primary sources of data for phase 1 were the data from the literature search as well as the results of the tests administered in the pre-testing. Secondary data was the clinical observations made during the assessments.

4.3.5 Phase 1 Variables

The dependant variables are defined as variables that are predicted or otherwise monitored by the researcher that describe the problem in the study, and are affected by manipulation of the independent variable (Cooper & Schindler, 2008, p. 702). Four dependant variables were identified for the pre-testing stage: the existing language test content, the existing language test structure, linguistic factors influencing the language test and cultural factors observed. These variables were determined from the recommended clinical test adaptations in environments where there are no standardised tests available (Holding, Abubakar, & Kitsao-Wekulo, 2010). The following table summarises the dependent and independent variables for

phase 1 of the study including the corresponding variable indicators and their relationship to the proposed study objectives.

Table 4.2 Phase 1 Variables

	Variable Unit of analysis	**Variable** **Indicators**	**Corresponding** **objective**
Dependent **Variable : Existing language test**	1. Language test content 2. Language test structure 3. Linguistic factors 4. Cultural factors	1. L-b LD Indicators; 2. Test evaluation schedule; 3. Test development, transfer and application guidelines.	1. To identify the components of existing tools that could be culturally appropriate for bilingual isiZulu speaking learners in grades 1, 2 and 3. 2. To identify early indicators of L-b LD and evaluate their relevance and application to isiZulu speaking learners.
Independent Variable: **Factors measured**	1. Performance Grade 1 learners 2. Performance of Grade 2 learners 3. Performance Grade 3 learners 4. Female vs. male	Criterion-based competencies for each test used.	

4.3.6 Phase 1 Data Collection

Preliminary conceptual decisions were achieved through an exploratory systematic literature review, development of the conceptual framework, as well as the determination of the core elements of the expected tool and the available tests that could be used in the clinical trial. Systematic collection of data from an organised literature search, reviewing books, journals and professional literature resulted in an extrapolation of information regarding the characteristics of L-b LD from the existing diagnostic tools (Cooper & Schindler, 2008, p. 102). The systematic literature review was important to expand understanding and refine the research question. It informed of the sources for the questions, the sample frame and the core adaptations that needed to be made in the administration of the proposed diagnostic test for applicability to the South African population and more specifically to isiZulu language speakers.

A pre-test phase was conducted to collect evidence of current L-b LD assessment tools in terms of limitations in reliability, validity or responsivity for the target population (Holding, 2014: Personal interview, 6 November). The rationale for pretesting includes a lack of South African resources or appropriate tools in this area of study. There is an advantage that the existing tests have already gone through the process of validation and therefore stand as guidelines for assessment. It also facilitates comparative studies which also increases validity of the new test material (Oakland & Lane, 2004). Furthermore, elements of the existing standardised tools could form the foundation for the structure and principal constructs of the new bilingual isiZulu-English assessment tool.

Pretesting with international standardised tools was acceptable because the participants of the standardization studies of the developed assessment tools are different to the participants in this tool, yet the abilities assessed in the existing standardised tests were also the target abilities evaluated by this study. Additionally, the results of this study were not going to be used for the same purpose as the available standardised language tool. The careful and systematic recording of the limitations of standardised tools for the South African learners were guided by the tool evaluation schedule and the test transfer and application manual of the International Centre for Behavioural Studies (International Centre for Behavioural Studies, 2012).

Two tests were selected for testing and application in the first phase of this research study. The Clinical Evaluation of Language Fundamentals 4th Edition (CELF-4) was selected as it is a familiar test used by 45% South African Speech language therapists in schools (Dulm & Southwood, 2013). The CELF 4th Ed (UK) was originally designed in the United States of America (USA) and the fourth edition was adapted for British children in the United Kingdom (UK). The CELF-4 in its standard format should not be used to evaluate African

learners without adequate adaptations for the target population. However, for the purposes of this research, the test items and illustrations were administered in their original format in order to determine technical and structural limitations, determine possible administrative adaptations, establish response to content, visual materials, instructions and administrative style in order to design a culturally appropriate assessment tool. Permission to use the test without license payments was granted with the understanding that the test would not be altered or copied and only used for research purposes stipulated. The instructions were systematically translated by isiZulu speaking professional translators.

The Phonological Awareness Test (PAT, Robertson, Salter, & Linguisystems.inc, 1997) was selected as it is also a known tool used in South Africa and it specifically looks at phonological awareness skills, a significant indicator of L-b LD (Wilsenach, 2013). The PAT is also a familiar test used by school based therapists in remedial schools in KwaZulu-Natal (KZN) as confirmed in a telephonic interview with two experienced school based therapists, with work experience in schools in Gauteng and KZN provinces (L. Loubser, 2014, Personal Communication, 4 June & T. Mdlalo, 2014, Personal communication, 4 June).

The researcher as a professional Speech- Language Pathologist administered the tests individually to 10 primary school learners. The learners attended grades 1, 2, and 3 at the time and were registered in 3 different schools in the research target area. Qualitative methods were used to determine test areas that were relevant, challenging, linguistically and culturally appropriate. Various aspects of the test results informed of the underlying skills identified earlier as relevant for L-b LD *i.e*. listening, language, reading, spelling, math and metacognitive abilities. These tools were utilised with minor practical adaptations and administered without any other alteration to the structure and materials. The pre-testing informed the researcher of the considerations for test item selection, determination of

administrative procedures and psychometric evaluations necessary for the proposed diagnostic tool.

4.3.7 Phase 1 Data Analysis

The plan for data analysis in phase 1 was to apply descriptive analysis in order to qualitatively extrapolate information from existing literature as well as the pre-testing with standardised tools. Data from the literature review was prepared for categorical analysis into the structural, linguistic and cultural factors. Data from the pre-test results, were quantitative in nature and were analysed through descriptive statistics using SPSS 23. The unit of analysis was individual-level responses on each subtest of the instruments used (Holding, Abubakar, & Kitsao-Wekulo, 2010). Several aspects of responsiveness to the tool were evaluated using the general linear model. Responsiveness is described as how the test performance changes with exposure to diseases, nutrition, or other environmental exposures in the target population (Holding, Abubakar, & Kitsao-Wekulo, 2010). For this assessment, variables that were considered for responsiveness were school, grade level, age, as well as the learner's experience with formal language assessment and competency in English language**.**

4.4 Methodology Phase 2: Tool Design and Development

4.4.1 Phase 2 Research Design

The second phase of the study relates to a multi-step process of development of the new language assessment tool namely, the Bilingual Battery for Language-based Learning Disabilities (BBL-BLD). A quasi-experimental design guided this phase of research where a post-test only group design was followed to determine the effect of the modification process on the dependent variables (Johnson, Turner, & Onwuegbuzie, 2007). In this design the pre-test measurements are omitted. To ensure internal validity, randomization is recommended for sampling (Cooper & Schindler, 2008, p. 260). By using the semi or quasi experimental

design, a researcher can decide when and who to measure (Cooper & Schindler, 2008, p. 262). Quasi-experimental design is favoured for its simplicity however, greatly criticised for internal validity threats. Experienced researchers recommend looking out for validity threats from history, maturation, selection and statistical regression (Johnson, Turner, & Onwuegbuzie, 2007). These were controlled in this study through the parental and teacher questionnaires as well as the use of the Delphi panel reviews.

The Delphi technique is well suited as a method of consensus building for the purposes of goal setting, policy investigation or predicting the occurrence of future events (Hsu & Sandford, 2007, p. 1). This technique is relevant in this research as it fully investigates based on people who are most knowledgeable and involved (Hsu & Sandford, 2012). The experts answer questions in two or more rounds with their responses aggregated and shared with the group after each round. The Delphi technique is characterised by anonymity of participants which eliminates the effects of dominant opinions which is observed in other group based processes (Hsu & Sandford, 2012).

Another advantage of the Delphi technique is that it allows for geographic dispersion of the subjects as well as the use of electronic communication which is real time and saves time (Hsu & Sandford, 2012, p. 2). The cyclical process of tool development-trial-tool modification and review was used using five (5) schools, each school representing a single post-test group. The objective was constant adaptations in order to achieve a final draft where the test constructs would be accurate, linguistic factors accounted for and cultural elements would have been acknowledged (Hsu & Sandford, 2012, p. 2).

4.4.2 Phase 2 Study Population and Sampling

4.4.2.1 Delphi Panel

The Delphi panel members were selected using purposive sampling. A balance of panel members with relevant experience in the areas of linguistics, statistics, clinical assessment in schools, isiZulu culture, experience with L-b LD and public health were sought. In addition, some experts with language proficiency in isiZulu or experience in working with isiZulu speaking children were involved. Cooper and Schindler (2008) recommend a group of six (6) to ten (10) people for focus group discussions, however for Delphi method the number of participants depends on the research aims and type of study (Cooper & Schindler, 2008, p. 179). Five panel members were recruited in order to limit bias, control for quality in the process and create a statistical balance for evaluation purposes. A precedent for using five members in similar tests were found for instance in the Grover Counter Scale (Grover, 2000). The distribution of experience and skill was excellent as each member brought in a unique contribution and view from a clinician, researcher, psychometric and language test development perspectives.

The distribution of the population and samples were as follows:

Delphi study population: experts in linguistics, speech language therapy, statistics, educational assessment, L-b LD, public health and research formed the population for the second phase. Delegates represented different specialty fields required in tool development.

Delphi sample frame: researchers from three universities in South Africa namely University of Zululand, University of KwaZulu-Natal and University of Witwatersrand, one university in Kenya and two professional members who practiced as school based therapists.

Delphi sample unit: was one expert with experience in one or more fields.

Use of knowledgeable experts to assess suitability of each item on vocabulary, information and comprehension was recommended when referring to language bias in the adaptations of the standardised tools (Foxcroft, 2011). The Delphi panel discussions used the online communication platform, wherein anonymity of responses was maintained among the participants. The Delphi panel meetings contributed to the fairness of the tool through the multi-step evaluation of the different aspects of the tool.

4.4.2.2 Learners

In keeping with the universal principles of assessment, the sample selection of learners was responsive to the growing demands, increased diversity and increased inclusion of all types of students within the reference population. Therefore, involvement of learners in both urban and rural areas was ensured as well as selection of learners from both English and isiZulu medium schools. Learners from four mainstream and one remedial school were selected for piloting and tool trials. Prior experience in speech or occupational therapy assessment or intervention was reported as possible contextual contributor to performance in studies with the CELF- 4 (Massa, Gomes, Tartter, Wolfson, & Halperin, 2008). In this context, prior experience with formal testing was not used as inclusion or exclusion criteria as such services are not available to the majority of the learners in South African Schools. This is based on the statistical representation of SLTs and occupational therapists in the areas involved (Health Professions Council South Africa, 2012). A sample of 75 to 100 participants was recommended for psychometric evaluation with a newly developed tool (Holding, Abubakar, & Kitsao-Wekulo, 2010, p. 13). This target was maintained for each cycle of draft evaluation as the age and grade range of the learners had to be representative in each school set up.

The distribution of the population and sample for the trial phase 2 are as follows:

Learner population: isiZulu-English speaking learners in grades 1, 2 and 3. An isiZulu speaking learner is referred to as a learner whose first language is isiZulu and a learner who uses this language predominantly at home even though English maybe used as a language of learning and teaching (LoLT).

Learner sample: 460 isiZulu-English speaking leaners with or without L-b LD from one remedial and four mainstream primary schools in KZN. One rural, one peri-urban and three urban located schools were involved. Four schools used English and one used isiZulu as LoLT.

Learner sample unit: one isiZulu speaking learner, who may or may not present with L-b LD; enrolled in grade 1, 2 or 3; in a primary school or a remedial primary school in KZN; where either isiZulu or English is used as LoLT.

A non-probability sampling approach was appropriate for this phase of the study. A purposive sampling technique with stratification according to grade and gender was employed in order for the most informative sample to be collected. The intention of the sampling method was to ensure participation of a representative sample of the general population of learners in each site. The inclusion or exclusion criteria below were used as the basis of participation. The variability of the sample was regarded more important than the number of participants as it has been established that there is great variance in the performance of bilingual children (Paradis, Schneider, & Duncan, 2013, p. 2). Considering the universal principle of inclusive assessment, it is recommend that field tests should sample every type of student expected to participate in the final administration of the tool across the socio-economic lines (Kunnan, 2014).

Participant inclusion criteria were:

a) IsiZulu speaking learners with adequate language abilities to communicate in isiZulu at home as determined by parental questionnaires.
b) Learners identified by the class teacher and parents as demonstrating one or more of the five indicators of a language learning disorder.
c) Learner in remedial or mainstream primary schools in KZN.
d) Learners enrolled in grades 1, 2 or 3.

Participant exclusion criteria were:

a) Learners from an isiZulu speaking family but who do not speak isiZulu at home.
b) Learners with concomitant developmental impairments such as pervasive developmental disorders or autism, Down's syndrome, cerebral palsy and other neurological illness such as epilepsy.
c) Learners with impaired hearing or vision.
d) Parent failing to fill in the parental observational scale.

The following Table 4.3 describes the general profile of the learners tested, descriptions, culture and socio-economic factors considered to have an impact on the results. The parent and teacher questionnaires provided information about social, linguistic, visual and general medical factors reported in this table.

Table 4. 3 School Profiles

School	**A** **Mainstream** **Fee paying**	**B** **Full service** **No fees** **Meal subsidy**	**C** **Remedial** **Fee paying**	**D** **Mainstream** **Mixed fees** **Meal subsidy**	**E** **Mainstream** **Fee Paying** **Meal subsidy**
Location	Urban Northern KZN	Semi- rural, Northern KZN	Urban Northern KZN	Rural KZN Midlands	Urban Ethekwini Metro
Learner	**N=58**	**N=141**	**N=48**	**N=102**	**N=91**

distribution	Males=31 Females=27	Males=77 Females=64	Males=31 Females=17	Males=75 Females=27	Males=48 Females=43
LOLT	**English**	**English**	**English**	**isiZulu**	**English**
Grade1	Grade 1=21	Grade 1=35	Grade 1=15	Grade 1=40	Grade 1=27
Grade 2	Grade 2=27	Grade 2=64	Grade 2=16	Grade 2=21	Grade 2=35
Grade 3	Grade 3=10	Grade 3=42	Grade 3=17	Grade 3=41	Grade 3=39
Language of Teaching	English/ Afrikaans	English/ isiZulu	English/ Afrikaans	isiZulu	English
Social Factors	Living with parents= 79% Guardian= 11% Grandparents= 10%	Living with parents= 86% Guardian= 5% Grandparents= 8.5%	Living with parents = 89% guardian=3% Grandparents= 8. %	Living with parents = 74% Guardian= 2.9% Grandparents= 20.6%	Living with parents = 96.7% guardian= 3.3% Grandparents 0%
Medical Factors reported	4%	0%	8,2% Asthma	2% Epilepsy	2% Epilepsy
Questionnaire responses: Difficulty as observed in the LOLT					
Following Directions	18%	25%	49%	25%	27%
Expressive language	76%	24%	31%	52%	11%
Receptive language	10.2%	30%	36%	51%	36%
Writing/ spelling	22%	35%	34%	32%	23%
Diagnosed ADHD	8%	0%	22%	6.9%	3%
Vision	92% GOOD	83% GOOD	96% Good	84% Good	92% Good
Hearing	96% PASS	95% PASS	100% PASS	96% PASS	100% PASS

4.4.3 Hearing Screening

Hearing screening is defined as a process of applying selected tests to a group of people with no apparent signs or symptoms of the apparent disorder, for the purpose of separating those at increased risk of having the target disorder and for whom further assessment is warranted (Roush & Mundy, 2012, p. 3). Hearing Screening is considered a critical part of comprehensive language assessment as hearing loss is associated with impaired language

acquisition, learning and speech development (Fitzpatrick, Whittingham, & Duriex-Smith, 2014). Furthermore, hearing screening prior to language testing is important as the probability of mild hearing difficulty, which may not be detected by family members, is generally high (Roush & Mundy, 2012, p. 3). A longitudinal 20 year study on neonatal screening in the USA, proved that as much as 46% of children who were identified with permanent, congenital hearing loss, presented with mild bilateral or unilateral hearing loss (Fitzpatrick, Whittingham, & Duriex-Smith, 2014). Bilateral moderate to profound hearing impairment is also highly prevalent as it occurs in 1 in 750 children worldwide and it is congenital in 80% of affected cases.

Hearing screening is an outright indicator for language impairments in bilingual children (Roush & Mundy, 2012). Pure tone screening is reportedly the most popular choice of screening in research as it is quick and simple for school aged children to understand (Roush & Mundy, 2012). The Health Professions Council of South Africa (2007) guidelines on early hearing detection and interventions programs in South Africa were used (Health Professions Council South Africa, 2007). The guidelines specified wearing the full ear covering headphones, testing frequency pure tones (500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz) with an average pass result for hearing the tone at the level of 30dB to 40dB HL. However, for the trial assessments the limit of 40 dB for all learners was deemed acceptable to allow for the ambient noise effect.

An Audiologist conducted the tests prior to the language testing of each child who participated in the study. As a Speech-Language Pathologist and Audiologist, I was prepared to explain the results of the screening to the parents and teachers of the learners who did not pass the screening test. The importance of a thorough follow-up examination was explained to the parent/guardian as appropriate. The choice of the hearing screening environment was

considered to be very important. Ambient noise check was conducted using an audiometer sweep at 20dB for all frequencies up to 4000HZ as recommended in the guidelines for the provision of Hearing Screening Services in Schools (Health Professions Council South Africa, 2007; Roush & Mundy, 2012, p. 38). Learners who failed the screening test were then excused from the study.

4.4.4 Phase 2: data collection methods and tools

Data collection in phase 2 was collected using three methods. These were exploration of the tool trials, Delphi panel reviews as well as the parent and teacher questionnaires. The exploratory data and raw scores collected from assessment with each draft of the tool were the first basis for analysis. Observations from the assessments were noted and modifications to the tool were reviewed by the Delphi panel for discussion. The objectives of the Delphi panel were:

a) To verify the relevant indicators for isiZulu-English speaking learners.
b) To comment on the content of the core tool item list of the possible items.
c) To comment on the structural format of the tool including translations and images as the tool was modified.
d) To comment on the administrative elements of the tool including the clarity of instructions, the usefulness of the example items, the length of the tool.
e) To comment on the plan for scoring and analysis of results.

Item generation for the tool and the assessment of its face validity were achieved through the Delphi technique. The modified tool was presented to the Delphi panel for reviews and put to test through the field trial and validation. The dependant variables (tool structure, content, linguistic and cultural appropriateness) were measured through the five iterations of the Delphi reviews.

Once the modification process was completed, the Delphi panel evaluated the tool development process and its outcome using an evaluation questionnaire. The evaluation questionnare was adapted from QUADAS, a quality assessment tool for studies of diagnostic accuracy and therefore a relevant tool to use in this study (Whiting, Rutjies, Riesma, Bossuyt, & Kleijnen, 2003). Comments made by the Delphi panel regarding elements of the tool and the development process were kept confidential and recorded by the principal researcher Instead, a summary of the deliberations was made and sent to all members in a form of a questionnaire for consensus building (Hsu & Sandford, 2012).

The parent questionnare was used collect biographical data regarding the learners including information about the family and a parent's perspective on the learners' language skills. Caution was exercised regarding use of data collected from parents since using self- reporting questions or self-introspection was found to be challenging in some African cultures (Foxcroft, 2011, p. 11). To counter this challenge, the questions used in the questionnaire were closed ended and only requested direct information about the learners. The socio-economic status of the parents was estimated through parent education levels; employment status and occupational title. Massa *et al.* (2008) found that this method provided a relatively good estimate of socio-economic status which impacts on the parent's perception of the language impairment (Massa, Gomes, Tartter, Wolfson, & Halperin, 2008, p. 103).

Parent involvement and availability to respond to a questionnaire was also a good indicator of their own literacy levels. The completed parent questionnaires became the secondary source of data as it provided input about cultural and linguistic beliefs. Research also revealed that parents can be a reliable source of information on their child's language skills and offer clinical value (Massa, Gomes, Tartter, Wolfson, & Halperin, 2008). Findings from CELF 3 evaluation studies revealed that parents may be in a better position than teachers to

distinguish culturally accepted linguistic variations in dialects value (Massa, Gomes, Tartter, Wolfson, & Halperin, 2008, p. 102). Precedents for inclusion of a questionnaire as part of the tool were found in standardised tests such as the CELF-4 (Wiig, Secord, & Semel, 2004), Rossetti Infant-Toddler Language Scale (Rossetti, 2006), and Ski-Hi Language Development (Watkins; SKI-HI Institute Utah State University, 2004), and Test of Auditory-Processing Skills (TAPS-3) (Gardner, 2005) .

Teacher participation assisted in determining if the child met the inclusion criteria. The learner's scholastic performance was gathered through teacher comments in five learning areas i.e. listening, reading, written language, expressive language, numeracy. There has been some evidence of teacher ratings resulting in poor sensitivity and specificity in identifying learners with impaired oral language skills (Alduals, Shoeib, Al-Hammadi, Al-Maiki, & Alenezi, 2012, p. 478). Parents' comments on an observational scale were found to be informal and only offering qualitative data. Therefore, use of more than one assessment tool and merging the results when specific pragmatic information is required is a sensible solution (Alduals, Shoeib, Al-Hammadi, Al-Maiki, & Alenezi, 2012, p. 477)

4.5 Phase 2: Data Analysis

Descriptive statistics was used to analyse the scores obtained from the tools. According to Holding *et al.* (Holding, Abubakar, & Kitsao-Wekulo, 2010) in clinical research assessments data evaluation is typically based on descriptive statistics which describe item responses, item discrimination and item-by-item analysis. Dimensionality assessment was conducted as recommended for each measure using exploratory and confirmatory factor analysis (Holding, Abubakar, & Kitsao-Wekulo, 2010). Thus, different aspects of the tool needed constant observation and analysis of the tool constructs, administration including instructions and

illustrations, cultural sensitivity, language content and use, tool scoring and analysis. Table 4.4 refers to the variables which guided analysis for the second phase of this study.

Table 4. 4 Phase 2 Variables

Phase 2	Variable Unit of analysis	Variable Indicators	Corresponding Objectives
Dependent **Variable : Developed** **language tool**	1. Tool content 2. Tool structure 3. Tool illustrations 4.Tool Administration 5. Tool analysis.	1. Linguistic profile 2. Cultural Profile 3. L-b LD Indicators; 4. Test evaluation schedule for cultural and linguistic appropriateness.	1. To develop culturally and linguistically appropriate tool components (tool constructs and items). 2. To develop an isiZulu assessment tool that is linguistically, culturally and theoretically sensitive to diagnose L-b LD (design and administration). 3. To pilot and adapt the tool for cultural and linguistic appropriateness for learners in grades 1, 2 and 3.
Independent Variable: **Factors measured**	1. Scores Grade 1 2. Scores Grade 2 3. Scores Grade 3 4. Scores Female vs. male.	1.Descriptive statistics 2. Delphi Panel reviews.	

Qualitative observations, by the testing team were used to make recommendations to the Delphi panel regarding linguistic and cultural adaptations. The linguistic and cultural profiles referred to as variable indicators in Table 4.4 were a result of this process. The Delphi discussion schedule and the tool rating scale guided the descriptive or qualitative analysis of the responses. Analysis of the parent and teacher questionnaires were quantitative using measures of central tendency. The mean, mode and range of scores were identified for each learner and tabulated for each grade and school.

As much as this research agrees with developmental view for clinical assessment, the principal researcher needed to analyse the learner's performance on the tool in relation to their grades and not just age. The motivation for the use of grades was firstly, the focus of analysis in this phase of the research was the tool not the learner; secondly, the age at which children start school and progress through their grades is not uniform in terms of age. To analyse the results in a uniform manner, the variable of grade instead of age was preferred.

4.6 Phase 3: Methodology

This phase of the research aimed to address objectives of validity and reliability of the tool. Validity in quantitative research is concerned with whether the findings are really what they appear to be. Validity in qualitative research means appropriateness of the tools, processes and data (Leung, 2015). Internal validity of the study refers to the degree to which estimates of diagnostic accuracy have not been biased (Whiting, Rutjies, Riesma, Bossuyt, & Kleijnen, 2003, p. 3). External validity refers to the degree to which the results of the study can be applied to other findings in practice (Whiting, Rutjies, Riesma, Bossuyt, & Kleijnen, 2003, p. 2).

In order to improve validity in this research, the choice of methodological tools emphasised the importance of culture and language. Validity was determined through the evaluation of the agreement between the responses from teacher questionnare and the L-b LD indicators as determined by the scores. Apart from the identified threats to validity, additional factors that were likely to influence the test scores were identified to be environmental, test taking behaviour and dispositional factors (Schaap, 2011, p. 1). The behaviour assessment questionnaire was designed to be completed at the end of an assessment with each learner in order to enhance validity related to these threats.

In quantitative research reliability refers to exact replicability of the processes and the results (Leung, 2015). The evaluation of reliability in qualitative research relies on consistency or repeatability of measures (Leung, 2015). Using the triangulation method through trials with the tool, Delphi panel reviews and therapists' focus group enhanced validity of the project. The reliability of the tool was also analysed statistically through co-efficient alpha for internal consistency measurements. The following reliability estimators were used:

a) Inter-rater or observer reliability or the degree to which different raters or observers give consistent answers or estimates. The Cohen's Kappa was calculated using SPSS 24. The Kappa can range between -1 to +1. Therefore, a (K) of .5 indicates a moderate agreement.
b) Test-retest reliability which is the consistency of a measure evaluated over time. Pearson's correlation was calculated using SPSS 24 used.
c) Internal consistency reliability or the consistency of results across items, often measured with Cronbach's Alpha.

This final phase of the study adopted a form of the quasi-experimental design as described earlier namely the post-test only group experiment. Internal consistency was evaluated through test-retest reliability using comparisons of means from the two trials. The trials were two weeks apart which increases reliability as it is recommended that the shorter the time the higher the correlation (Trochim, 2006). The inter-rater evaluations were calculated using Cohen's kappa in SPSS version 24.

4.6.1 Phase 3: Population and Study Sample

A non-probability sampling approach was appropriate for this phase as it needed representative sampling as well as comparability of cases (Teddlie & Yu, 2007, p. 79). A purposive sampling technique with stratification according to grade and gender was

employed in order for the most informative sample to be collected. The inclusion or exclusion criteria were used as the basis of participation. Equal number of participants to represent a group of learners with and without L-b LD was recommended. Since the aim was to detect the indicators of L-b LD the sample units should be learners whose L-b LD status is known. A total of 17 participants who were found to have one or more indicators of L-b LD took part in this phase. The presence of the L-b LD indicators was determined through the completed teacher questionnaires.

The sampling technique was based on the following reference information:

Reference population: isiZulu- English speaking learners in grades 1, 2 and 3, identified as L-b LD through the teacher questionnaire.

Target population: isiZulu-English speaking learners positively identified as L-b LD, who were speakers of isiZulu and English, in grade 1, 2 and 3 in schools in the north coast of KZN.

Accessible sample: 17 learners who were positively identified as to L-b LD who fit the inclusion criteria from a mainstream and a remedial primary school in KZN.

Sample unit: one learner.

4.6.2. Phase 3 Sources of Data

The primary sources of data were the two sets of the learner's scores. The tool served as both the data collection instrument and the actual outcome of the data collection process.

4.6.3 Phase 3 Variables

The following table demonstrates the dependant and independent variables for phase 3, their corresponding indicators and their relationship to the proposed study objectives.

Table 4.5 Phase 3 Variables

	Variable	Indicators	Which objective is covered
Dependent variable: **L-b LD Indicators**	1. Problem1-Listening skills. 2. Problem 2-receptive and expressive language. 3. Problem 3- Reading 4. Problem 4- written language. 5. Problem 5- Maths and processing.	1. Teacher questionnaire	1. To validate the linguistic, administrative and content elements of the diagnostic tool. 2. To determine the reliability of the findings for bilingual learners in grades 1, 2, 3.
Independent Variable	1. Learners per grade. 2. Learners per age group. 3. Learners per gender.	Statistical evaluation tools: Test-retest measurements; Inter-rater reliability, Internal consistency.	

4.5.5 Phase 3 Data Collection Methods

Phase 3 involved assessing the language skills of learners with known characteristics of L-b LD using the Bilingual Battery for L-b LD. Two raters collected the data from the 17 participants on two separate sessions.

4.5.6 Phase 3 Data Analysis

The analysis of the validity of the BBL-BLD had the goal to determine whether the tool could discriminate between learners presenting with indicators of Lb.-LD and those who did not. The teacher questionnaire predicted the results of the test and assumed the position of the ground truth. In the light of a lack of a similar tool to the BBL-BLD there was no other tool to use as the benchmark under reasonable conditions (Cardoso, Pereira, & Ramos, 2014, p. 27). The use of the gold standard is common in language tool development. However, recent

research indicates that its use is dependent on the context of the statistical method being used (Cardoso, Pereira, & Ramos, 2014, p. 28).Therefore, the teacher questionnare and the Therapists' focus group was utilized in the validity analysis as it was designed to determine the same L-b LD indicators targeted in the tool. The statistical analysis was run through the SPSS 24 using the significance level of $p<0.005$.

The statistical analysis was to look for the following elements:

a. False Negative rate (%) measured the percentage of the sample that the test battery has incorrectly identified indicators of L-b LD (Cardoso, Pereira, & Ramos, 2014, p. 27). A preferred result would be one that is not high (0% is best), otherwise use of the tool would result in denying learners who need intervention a chance to be helped.
b. False Positive rate (%) measures the percentage of learners the test battery has incorrectly identified as non-L-b LD. This should ideally be low (0% is best), otherwise use of the tool would result in wastage of resources on learners who do not need intervention.
c. Specificity measured the proportion of learners who were found without the inherent condition (Lb.-LD) who the battery has correctly identified as true negative (non- L-b LD) (Cardoso, Pereira, & Ramos, 2014, p. 28). Specificity formula is 1- False Positive rate. It measures the proportion of the learners presenting with problems in the learning areas that were correctly identified by the test battery. A specificity recall of 100% would imply that the tool identified all the learners with L-b LD, although it may include the learners without the indicators among those identified to have L-b LD.

Precision measured what proportion of the learners who were found to have L-b LD actually have difficulties in problem areas identified. A precision of 100% would mean that the tool

identified only the learners with L-b LD, although it might not be identifying all of them. A good diagnostic tool must have a high sensitivity and specificity. Since specificity is the ability to predict a negative outcome (absence of indicators); sensitivity refers to the ability of the test to identify the proportion of the sample with the inherent condition, in this case, presence of L-b LD indicators (Cardoso, Pereira, & Ramos, 2014, p. 27).

4.7 Pilot Study

There was great value in piloting the materials prior to the field trial phase of the study. Exploratory testing the feasibility of the bigger study through a pilot study is recommended as an objective assessment for feasibility and a responsible gesture before subjecting children to unnecessary testing (Thabane, et al., 2010). Feasibility of this study was determined for the construction of the parent-teacher questionnaires, the rating scales for the Delphi panel as well as for the uniformity of the testing procedure in field trials. The benefits of a pilot study for phase two were the opportunity to test the clarity and accuracy of the Delphi evaluation questionnaires, the structure, administration and translation of the developed tool blueprint.

The motivation for a pilot study before the field trials was to gain information about the research process, the resources required, management of the assessment process and refinement of the tool blueprint prior to its administration on children in a field test (Thabane, et al., 2010, p. 4). Prior to the field trials the following was ensured: the appropriateness, clarity and ease of understanding of language used in the tool instructions as well as the parent observational scale; lack of ambiguity, sensitivity to gender and cultural issues; determine item difficulty and bias to geographical area. Careful attention was drawn to the research assistant's performances and consistency on administering the tool through the research assistant's workshop.

The pilot study provided the opportunity to:

a. Improve the consent forms for clarity about the involvement of the learners in the three steps of research process, which are the parent-teacher questionnaire, the hearing screening and the language assessment.
b. Observe the amount of time spent away from class, which addressed the parent's concerns about missing classes.
c. Clarify that the assessment conducted for research did not have any contribution towards class marks, placement of children in each class or the remedial school. Parents were concerned that the children were picked for participation because of a certain identified problem by the teachers. Therefore, the purposive random selection procedure was clarified in the information letter to participating parents.
d. The parent-teacher questionnaire was modified according to the suggestions from the teachers and information from the research assistant's workshop.
e. The scoring system on the questionnaire was changed from a severity degree rating to a "yes or no" answer for simplicity and speed.
f. Hearing screening was a good indicator of the learner's ability to understand instructions in both isiZulu and English. Ambient noise was managed by requesting a test room away from the school corridors and common walking areas such as the hall or the tuck shop. Vision screening was not conducted but parents had to make a note about it in their biographical questionnare.

4.8 Study Reliability and Validity

Reliability factors were ensured in the following manner in the study:

a) The translators had experience in research or assessing children and were recruited based on personal recommendations by other researchers,
b) The testers were first language speakers of isiZulu and were fluent in English,

a) The testers underwent a week long training session on the developed tool (see Appendix 7 for the training evaluation form),
b) The learners were tested in a familiar environment, within their school facility and mostly within school hours.
c) The purpose of the assessment was explained to the foundation phase staff and school management team prior to the assessments in a workshop setting.
d) Learners were identified by the educators to fit the inclusion criteria and parental consent was sought as well as learners assent. Learners had freedom to participate or stop the assessment.
e) Additional teacher-parental questionnaires were filled to corroborate information about areas of weakness or strengths that might have contributed to the results.
f) Learners were assessed under flexible time conditions. Research shows that adequate time and planning has to be allowed in researching people with learning disabilities (Inglis & Cook, 2011, p. 102).

In Summary, the research design, methodology and the logical flow of the study is summarised in the following graph.

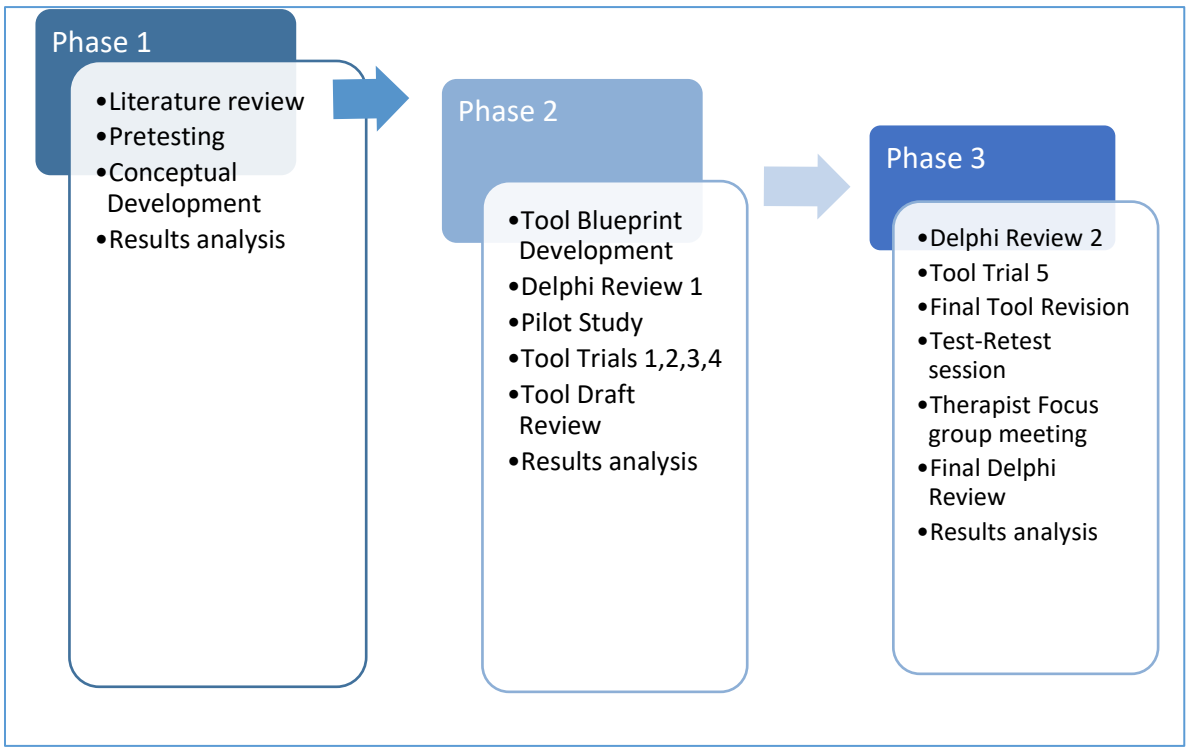


Figure 4.1 Summary of Research Methodology & Study Flow

SECTION B: METHODOLOGY FOR TOOL DEVELOPMENT

4.9 Tool Design and Development

The tool development process involved four stages of test development (Holding, Abubakar, & Kitsao-Wekulo, 2010). These stages were extended by repeating the tool modification development stages until the results and Delphi panel reviews indicated adequate adaptations to linguistic and culture factors. This study considered the development of a completely new tool utilising procedures discussed in Holding, Abubakar and Kitsao-Wekulo (Holding, Abubakar, & Kitsao-Wekulo, 2010). The procedures were supported by research conducted in Africa and in similar socio-economic conditions as South Africa. The first step was concept definition. This was a preparation step that provided a working glossary of terms and phrases in the target language. Concept definition served as a guide for translation and in

identification of relevant skills and behaviours salient to the target population (Holding, Abubakar, & Kitsao-Wekulo, 2010).

The second step was item pool creation. This step involved identification of original items that could be used to deduce the required information. In this step the cultural appropriateness of tool items were evaluated and adjusted or eliminated if they failed to represent the target population as informed by the pre-test study (Holding, Abubakar, & Kitsao-Wekulo, 2010, p. 8). The tool was designed to have high readability by including examples, items for trial, and instructions for use. Readability was improved by monitoring item length, avoiding words with dual meanings and use of high frequency vocabulary (Dempster & Reddy, 2007, p. 910).

The third step was developing a procedure for the newly developed tool. Different aspects were considered for appropriate procedures including the transparency of drawings, instructions, test location, scoring formula and trial items. Tool administration was designed, piloted and modified to suit the target population. The fourth step was psychometric evaluations where the language tool was put on trial and evaluated on how it performed with regard to consistency and concept definition. Tool reliability and validity were evaluated through the performance of learners. Analysis was detailed as it looked at item by item analysis, test-retest reliability, inter-rater reliability, face validity, and construct validity. The following Figure 4.1 displays the process of tool development.

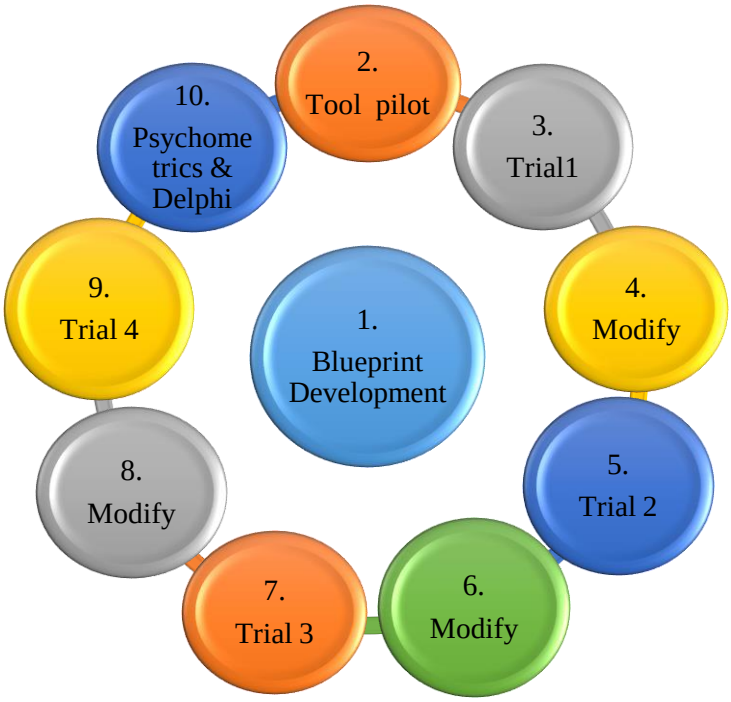


Figure 4. 2 Tool Development and Modification Process

Figure 4.2 demonstrate that the final step in the tool design process was psychometric evaluations. The theoretical framework guidelines discussed in chapter 3, guided the selection of items. The subtests design, which included test items and tasks were selected based on the five manifestations of L-b LD identified in the adopted definition of L-b LD (National Center for Learning Disabilities, 2013). These categories were listening, speaking and comprehension, reading, writing and math and also used as main sections of the tool.

4.9.2 Tool Constructs

Test constructs are skills and abilities that need to be evaluated (Kunnan & Grabowski, 2013, p. 307). Large scale language assessments should avoid assessment of construct irrelevant matters (Kunnan & Grabowski, 2013, p. 311). The subtests were designed to assess the following constructs:

a. Listening skills through following directions
b. Receptive language through story comprehension , word sums

c. Expressive language through word association, numerical vocabulary
d. Phonological awareness including isolation, blending, substitution and segmentation of sounds and words
e. Reading fluency and comprehension skills through reading and doing
f. Written language processing through the rapid automated processing tasks
g. Working memory involving phonics, words, digits and colours
h. Numerical language concepts through numerical problem solving.

Appendix A provides a table with detailed definitions of the constructs and application of the broad cognitive abilities that they are linked to. According to Sternberg (2009) dynamic assessment should be the kind of assessment that requires meta-components of thinking such as recognition of problems, definition of problems, formation of strategies, representation of information allocation of resources and monitoring and evaluation of problem solving (Sternberg, 2009, p. 8). The tool was designed in a manner that required metalinguistic skills in varying degrees. For instance, the story comprehension task requested retelling of the story, making assumptions and inferences, as well as evaluation of problems in the stories.

4.9.3 Item Pool Creation

Test items were carefully chosen using the standard Curriculum Assessment Policy Statement (CAPS) books on literacy and numeracy for each grade as a guide for vocabulary and level of complexity (Department of Education, 2002). The CAPS literacy books were used in order to select relevant language concepts and evaluate the vocabulary and comprehension as expected for each grade. The CAPS numeracy books guided the vocabulary choice, the level of instructions that was relevant for each grade as well as provided examples of math concepts and content for each grade. A 95% level of acceptance was used as a determining figure for item rejection (Holding, Abubakar, & Kitsao-Wekulo, 2010, p. 10).

4.9.4 Language of Testing

The research proposal initially planned for administration of the language tool only in isiZulu. However, the literature review and the pilot study revealed that testing learners in one language, even if it was their first language, provided with incomplete and biased results for ESL learners. The researcher realised that assuming that all isiZulu speaking learners have been exposed to the same concepts and vocabulary would result in content bias. Hence, the approach adopted in this study was a comparative analysis of the learner's skill in both English and isiZulu. Bilingual assessment would not only result in a culturally relevant tool for the modern population of isiZulu speakers but would provide more comprehensive results (Paradis, Schneider, & Duncan, 2013). The developed tool allowed for a choice of a preferred language of testing between English and isiZulu for some subtests, depending on the learner's language of learning and teaching (LoLT) e.g. reading and numeracy skills. This followed the principle that the language of testing must be the one preferred by the testees (Foxcroft, 2011, p. 11). For bilingual children, assessment of the language skills should be in both languages (Paradis, Schneider, & Duncan, 2013, p. 23). Language switching by the learner was noted in error analysis and noted as part of the learner's profile.

Thirdly, there are complex language issues involved in language assessment of learners with L-b LD who are also bilingual (Bialystok, Luk, & Kwan, 2005). The acquisition of language skills in the second language resembles second language acquisition in adults or influenced by the first language (Torres-Velasquez & Rodriguez, 2005). The second language may be delayed but not deviant (Meir & Armon-Lotem, 2017, p. 498). Careful considerations also should be taken for language choice for instructions, trial items, and examples as well as for phonics based subtests.

The tool was designed for bilingual assessment in order to obtain a more accurate measurement of the learner's abilities in languages for learning. However, cross linguistic transfer of skills would possibly occur in ESL learners for skills that were taught in English and concepts such as reading and mathematics. Thus, use of pseudo words in assessing skills such as phonological awareness eliminates interference from such phenomenon (Paradis, Schneider, & Duncan, 2013, p. 3). Pseudo-words were utilised in the subtest of phonological awareness of the BBL-BLD. The use of pseudo-words eliminated interference of language competency as contributor for poor skill (Meir & Armon-Lotem, 2017, p. 496). Finally, statistical equivalence of items were ensured in dual assessment for accurate evaluation of target skill.

4.9.5 Tool Procedure

The tool was designed to be administered to one learner at a time, in a quiet room with a learner seated next to the tester. A test booklet of pictures, a set of six crayons and a pencil were required for the learner to complete the tests. The learner was required to draw lines to match the words and pictures, colour in pictures in response to their reading instructions and fill in missing letters in phonemic awareness tasks. Familiarity with the testing situation could have an impact on learner's performance and testing (Carter, Lees, Murira, Gona, & Neville, 2005, p. 393). Thus, it was important to test learners in a familiar environment such as their school.

The approach to assessment followed the principles of dynamic assessment. The rationale for using dynamic testing was that it is an acceptable approach to assessment stemming from Vygotsky's sociocultural theory of learning (Lantolf & Poehner, 2010, p. 11). Since this theory was one of the foundations of the study it also formed a foundation for the tool. Dynamic assessment is defined as a way of assessing the learner's potential by embedding

instruction in the assessment process and allows use of supportive prompts in order to reduce bias due to unfamiliar illustrations (Lantolf & Poehner, 2010, p. 13; Carter, Lees, Murira, Gona, & Neville, 2005, p. 396). Various forms of dynamic testing were applied in the study including use of prompts (hands and fingers) in *phonological awareness* and the *working memory* subtests. The task stimulus variability method was applied in the reading subtests through the use of action-object oriented assessment tasks (Paris, 2005).

The basic plan for administrative methods and sequencing of tests were informed by the literature review and the results of the pre-testing phase. The plan for accommodation for learners with additional needs included additional time allocation. Additional accommodation for assessing math skills in bilingual learners were as follows: Assessment should target a number of math strands, with the purpose to identify areas of strengths and weaknesses (Raborn, 1995). In addition, assessment procedure should enable identification of performance in specific areas of mathematics within the capabilities of an individual student (Raborn, 1995).

Furthermore, assessment should observe how a student responds to new versus novel demands in math; how a student interprets math questions as well as how the student relates to quantifiable material and math stimuli in the environment is essential to understand in order to gain a holistic view of the student's abilities (Raborn, 1995). These considerations were critical to note as language skills also determine success in solving math problems. Therefore, the assessment method for sections with math needed to consider the totality of responses, looking into how the learner understood, interpreted and related to the concept considering his or her environment (Torres-Velasquez & Rodriguez, 2005).

4.9.6 Tool Illustrations

The use of pictures in assessment tools served to contextualise the tasks and to link activities to their own language (Stow & Pert, 2015, p. 12). Tool pictures were required for the following sub-tests: following directions, reading and spelling skills and the numeracy based vocabulary tests. Informal picture evaluations and adaptations were completed in stages using the Delphi and focus group discussions. Picture design and adaptations aimed at including a range of grammatical structures which were linguistically and culturally appropriate (Stow & Pert, 2015, p. 12).

A local artist was commissioned to develop pictures for the tool in order to limit the costs of the project and for increased appropriateness for culture. The pictures were designed to fascinate learners within the target age groups of six to ten years. Computer generated images were also included where concepts are difficult to illustrate or unclear. Carter *et al.* (2005) emphasise the importance of using culture appropriate illustrations, considering the age, gender, socio-economic status and schooling status of the learners (Carter, Lees, Murira, Gona, & Neville, 2005, p. 385).

This principle was applied by choosing pictures based on familiar animals. Considerations for use of animal characters such as cows and dogs as shown in figure 4.3 below were thought to be appropriate.

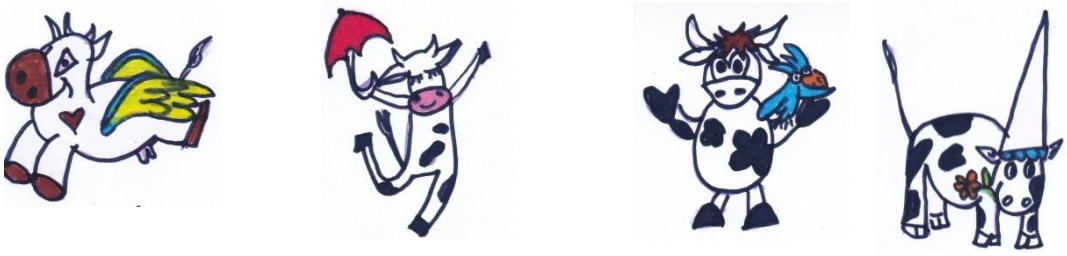


Figure 4. 3 Illustration for Following Directions in isiZulu

Four pictures in each row offered an adequate number of choices for selection of an appropriate response in *following directions* subtest. Figure 4.3 further illustrates that different sets of pictures were designed for the subtests that evaluated the same construct in two languages. For the *following directions* subtests this meant using completely new pictures and test items for each language in order for the assessment to be reliable. Some illustrations were also adapted from Microsoft clipart as they were found to be clear and concise as in Figure 4.4.

Figure 4. 4 Illustrations for Phonemic Awareness Subtest

The black and white hand drawn pictures were used for grade 3 learners in the reading and doing test as seen in Figure 4.5.

Figure 4. 5 Illustrations for Reading and Doing Subtest-Grade 3 level

The *story comprehension* subtest was designed to compare performance in English and isiZulu, where the task was presented first in English then in isiZulu. This procedure was important due to the utilisation of the same story, otherwise the learner could have used the translation from isiZulu to answer questions in the second instance.

4.9.7 Tool Scoring and Analysis

Scaling is defined as the process of associating numbers with the performance of examinees (Kelan & Brennan, 2004, p. 229). Scaling is intended to reflect the increasing levels of achievement or ability. Since the tool is in its development phase, a primary score scale had to be adopted to have the same meaning regardless of the tool form used (Kelan & Brennan, 2004, p. 229). A dichotomous scoring system using allocation of 1 and 0 was used based on developmental criteria set by the researcher. This was acceptable as the tool was at the developmental stage (Kelan & Brennan, 2004, p. 329). The benefits of allocation of 1 and 0 scores were simplicity, scoring could be administered by one rater and interpretation would be straightforward (Silvia, et al., 2008, p. 69).

Error analysis was adopted for linking the score with interpretation of results. The error analysis approach includes an internal focus on learner's creative ability to construct language (Saville-Troike, 2006, p. 37). Error analysis approach is based on Noam Chomsky's Transformational-Generative Grammar theory which stated that there is a relatively small amount of essential rules which account for basic sentence structures (Saville-Troike, 2006,

p. 37). Due to the perception that there is a finite number of rules and transformations in any language, it makes it possible to analyse learner errors in a descriptive or quantitative manner. This approach was adopted in this research because it is friendly to bilingual learners (Saville-Troike, 2006, p. 38). Preference for description and analysis of actual learner errors in the second language rather than idealized linguistic structures was attributed to first or mother tongue speakers of English (Saville-Troike, 2006, p. 38). Error analysis was viewed as a relevant approach in this research as it looks to a learner's errors as a source of insight into the learning process (Saville-Troike, 2006, p. 38). The results of error analysis was then linked to a set criteria for this population for language and numeracy materials based on the national standardised CAPS curriculum.

The procedure for analysing errors includes four steps i.e. *identification of errors, description of errors, and explanation of errors and evaluation of errors*. Targets were set and deviation from the set targets is recorded as errors. Descriptions were classified according to language levels as expected for each grade. These were stipulated for each subtest and each test item in a column next to the score. Explanation was drawn with reference to each learners' language context, ecological and medical factors. According to Saville-Troike (2006) such factors could include inter-lingual factors, negative transfer, interference with L1, intra-lingual factors and developmental factors (Saville-Troike, 2006, p. 39). The analysis profile at the end of the battery allowed for integration of results and explanation of the errors observed based on the combination of all relevant factors. Evaluation of errors provides an indication of the extent of the perceived language difficulty. The tool analysis and interpretation was critically designed to avoid labelling bilingual learners undergoing a typical process of second language learning as disordered. The analysis and evaluation of the scores were designed to be systematic and analysed as a whole rather than in parts.

4.9.8 Psychometric Design and Interpretation

The four historical approaches to interpreting cognitive tests are quantification of general level, clinical profile analysis, psychometric profile analysis and application of theory to interpretation (Flanagan, Alfonso, & Ortiz, 2012). Contemporary trends promote the interpretation of test results in relation to a theoretical framework. According to Kaufman, such interpretation allows for narrowing of the theory-practice gap (Kaufman, 2000). The Cattell-Horn-Carroll (CHC) Cross Battery Approach (Kaufman, 2000) is a systematic method for measurement and interpretation of intelligence and neuropsychological batteries and to augment them with other tests in a manner that is consistent and empirically supported (Flanagan, Alfonso, & Ortiz, 2015, p. 1).

This method is grounded in CHC theory of cognitive abilities (Flanagan, Alfonso, & Ortiz, 2012, p. 459). The three key concepts of the CHC theory that were pertinent in this research study are: Fluid intelligence, crystalized intelligence and the Gf-GC model. Fluid intelligence refers to inductive and deductive reasoning are influenced by biologic and neurological factors and incidental learning through interaction with the environment (Alfonso, Flanagan & Radwan, 2005, p. 198). Crystallised intelligence refers to the acquired knowledge through acculturation or previously learned experiences or procedures (Alfonso, Flanagan, & Radwan, 2005, p. 198). The current Gf-Gc model is broad, has 16 broad cognitive abilities and 80 narrow abilities (Schneider & McGrew, 2012). These include visual perception, short term memory, and long term storage, speed of processing, auditory processing, reaction time, quantitative knowledge, reading and writing abilities. Using the Gf-Gc model is believed to fill in the gaps in the measurement of cognitive and learning abilities (Schneider & McGrew, 2012, p. 127). However, due to its breath, no single intelligence battery measures all broad cognitive abilities.

Some of the guidelines of the CHC Cross Battery Approach that were adopted in this study were as follows:

a) There is a continuum of interpretation from the broadest levels of cognitive functioning to the narrowest level of cognitive function. Therefore, each broad ability is measured as purely and independently as possible however performance on each subtest can still be viewed in context of broader neuropsychological domains (Flanagan, Alfonso, & Ortiz, 2012, p. 472).
b) There is a bidirectional relationship between the main domains and the minor constructs. Therefore, each subtest is not interpreted in isolation but as part of the whole (Flanagan, Alfonso, & Ortiz, 2012, p. 472). Therefore, the information gathered from the teacher and parent questioners are considered in analysis of results and are used in understanding the learner's reasoning and perception (Flanagan, Alfonso, & Ortiz, 2012, p. 473).
c) Linguistic and cultural differences often affect the equivalence of constructs measured by the test as well as the test format, administration and speed. Therefore, all ecological factors that might influence the results are noted (Flanagan, Alfonso, & Mascolo, 2011).
d) In interpreting the results, the learner cannot be compared to another child who does not belong in the same norm group. The norm group is determined by language, culture, learning environment hence the learner's peers in the same school would be the best to use for comparison. If a learner is found weak in a specific broad ability, two or more indicators are necessary to make inferences about specific narrow CHC abilities (Flanagan, Alfonso, & Ortiz, 2012, p. 473).
e) Interpretation of results is made at cluster level rather than at subtest level in order to bear reliable results. The battery should be administered as a whole battery in order to interpret results as a cluster not in isolation. When supplementing information with another test, the

selected test has to be developed and normed for the same population and within a few years of one another (Flanagan, Alfonso, & Ortiz, 2012, p. 473).

f) To establish ecological validity, documents informing about the child's academic performance, acts of daily living and medical records may be used to make connections between cognitive dysfunction and educational impact. (Flanagan, Alfonso, & Ortiz, 2015).

Table 4.6 contains a summary of guidelines for differential diagnosis of speech and language conditions and L-b LD. The table indicates that there are possible similarities in the presentation of weaknesses in all learning areas. The tester needs to consider the combination of factors in order to make differential diagnosis.

Table 4.6 Guidelines for Differential Diagnosis

Learning Area	**Language-based Learning Disability**	**Language Impairment (Primary language)**	**Language difference (Typical Bilingual learner)**	**Below average performer or monolingual language delay**
1. Listening	Poor in listening to multiple instructions, poor in following written directions in L1 and L2.*	Poor concepts and understanding of instructions in L1. **	Poor understanding of instructions in English but adequate in L1. #	Can follow simple structure sentences but not cope with higher language processing. ***
2. Language	Language skills may be intact or below average in L1 and L2.*	Poor vocabulary in in L1. Generally poor sentence structure in L1. **	Poor vocabulary in English but appropriate language skills in L1. #	Short mean length of utterances; Delayed use of grammatical markers.
3. Reading	May have a concomitant reading disorder in L1 and L2.*	Some aspects of Reading skills in L1 may be grade appropriate or in line with verbal language skills. **	Reading in the L2 language may be fluent but reading comprehension depends on the understanding of the 2nd language rules. #	Reading skills may be below average or in line with verbal language skills. #
4. Spelling	May have a concomitant spelling disorder in L1 and L2.*	Spelling skills in L1 may be grade appropriate. **	Decoding skills depend on the understanding of 2nd language rules. #	Spelling skills can be below average or grade appropriate regardless of languages.
5. Math	May have a concomitant math	Language concepts in L1	Cognitive underpinnings of math	Has a general delay or performs below average

	disorder or perform better in math than in language or reading skill in L1 an L2.*	may have an influence on math performance in L1. ***	LD were found to be the same for children with and without co-occurring reading disorders in L1 and L2 (Mazzocco and Thompson, 2005).	in line with cognitive abilities. ***
Metacognitive skills	Poor planning, monitoring, use of appropriate strategies; evaluating outcomes. *	Poor- oral motor planning and monitoring but may improves with age. **	May be intact in L1 however, in additional language learning cognitive skills required may be delayed in L2.	Weak in some areas, strong in others regardless of languages.

Key For references: * (National Center for Learning Disabilities, 2013); ** (Schmitt, 2017), *** (Alt, Arizmendi, & Beal, 2014). # (Stow & Pert, 2015).

The results from each subtest yield a profile of strengths and weaknesses which assists in determining the plan of intervention for the individual learner. The clinician needs to consider cross-linguistic relationships in interpreting the results since the learners are likely to be bilingual isiZulu-English speakers. Phenomena such as transfer of cognitive and language abilities skills should be closely observed and not misinterpreted as L-b LD (Genesee, Geva, Dressler, & Kamil, 2006, p. 6-A-1). Furthermore, interpretation of results must be accompanied by knowledge that first language phonology might play a role in early stages of learning to spell, especially if the learner's first language orthographic system is shallow (Genesee, Geva, Dressler, & Kamil, 2006, pp. 6-A-1). The tester should not only be aware that the learner's first language could have an impact on his or her second language acquisition but be vigilant to note the various strengths and weaknesses displayed in each language tested.

Vigilance regarding the learner's behaviour during test taking is crucial. The observation by De Lamo White and Jin (2011) that the sociocultural and linguistic differences associated with bilingualism results in a more complex assessment procedure is shared by the researcher. Observing the child's behaviour is an important part of the socio-cultural

approach (De Lamo White & Jin, 2011, p. 614). The Behaviour observation checklist (Appendix E) was adopted from Holding (2014) for use in the trials with the BBL-BLD.

4.10 Ethics and Human Subjects Issues

Access and ethics have been found to be critical elements of research because the ability to collect data depends on access to the source. Access refers not only to physical but to cognitive access as well as maintaining that access and participation through the study (Saunders, Lewis, & Thornhill, 2009).This study was approved by the UKZN Biomedical Research Ethics Committee in 2014 (BE220/14). Access to a representative sample was approved from the provincial Department Of Education through the office of the HOD (See Appendix J for the DOE letter of approval). After a letter of approval was received from the DOE, access to schools was negotiated with the heads of the institutions and the school management teams. Furthermore access was negotiated with the teachers and parents of all learners in each school. Parents were informed about the objectives of the study in a school meeting and were informed of the letters that would soon follow with all the details of the study. This was done in order to guarantee a successful return rate of signed informed consent forms before the learners were involved into research. Each learner was given a choice to stop the test when s/he felt the need to do so.

Furthermore, parents were encouraged to join a *WhatsApp* chat group with the class teacher and the researcher to ask questions or seek clarity. This was a useful tool in minimising confusion and burden to the school management for enquiries relating to the research study. Prior to the assessment sessions at each school, a briefing meeting with the foundation phase educators was scheduled. It informed of the plan of assessment including the venues and procedures involved. This was necessary to ensure a good flow of learners from class to the assessment venues and minimise time wastage.

The parents of learners who were found to have language impairment or hearing difficulty were provided with feedback in person. The educators and school therapists, where applicable, had access to the preliminary feedback report for their school. Access to this data not only contributed to knowledge but contributed valuable information and observations form the school staff members, thereby adding value to the school community. Coded results obtained from the study were made available to the parents of the children who did not pass the hearing screening tests. There was an undertaking to provide a copy of the finalised diagnostic tool to each school that participated in the study and to the DOE for social benefit to other learners and schools.

The researcher's clinical experience as a Speech-Language Pathologist in a remedial school for learners with L-b LD was noted as a benefit for ethical practice in this research study. Moreover, the researcher as a first language user of isiZulu and upbringing within the isiZulu culture provided familiarity with the prevailing cultural values of amaZulu community. The researcher as a bilingual isiZulu-English speaker with history of using English as LoLT in high school contributed to the understanding of challenges faced by learners coming from similar backgrounds. These factors also increased the reliability of the results and contributed to validity of the findings. Solarsh and Alant (2005) reported that having a tester of the same race, language and culture partially addresses the unfamiliarity of the test situation. The researcher completed the TTREE modules 1-3 for ethics in clinical research involving human subjects enabling her to inform, train and guide the research assistants who were recruited to assist in assessing the learners (Solarsh & Alant, 2005, p. 5). Therefore, the participants were less susceptible to the effects of cultural bias. The table below summarises the ethical issues considered and the planned remediation for each one.

Table 4.7 Ethical Issues

Ethical issue	**Remediation**
Use of children or minors in the study	Signed Informed consent (standard UKZN consent forms); Informed assent obtained from each learners, confidentiality assurance, anonymity of participants, Low risk -benefit- ratio.
Racial and cultural sensitivity	The unbiased design of the tool, fair sampling method, Delphi panel review, parent observational scale translated to isiZulu and allowance for telephonic completion of the form was provided. IsiZulu speaking Research assistants.
Physical access to school, Continued access during school time	Permission from the school and the provincial and district DOE. Communication with parents, the grade educators and school management team. Assessment was planned to occur during school hours and within the school premises.
Disturbance of the school environment- educators/ HOD/ Principal and time away from class per child	Adequate planning, large number of testers to complete the process quickly, use of experienced and trained testers. Assessments were completed within one week per school to minimise disturbance of learning and normal school programs.
Protection of Intellectual property	Confidentiality, anonymity of participants, permission to use the standardised tests in the clinical trial.
Data handling and protection	Data coded and coding keys were kept separate from the results. Hardcopies kept in a locked cupboard in a secured office with alarm system, computer with data was secured with a password, and personal data was kept confidential. Data was not processed beyond the purpose of the study.
Social value	Individual children benefited from the diagnostic assessment. Results available to the school and DOE for initiation of intervention programs. Advancing knowledge of parents and school staff.

	A copy of the finalised tool to be issued to each school involved.

4.11 Conclusion

This research study used qualitative and quantitative research approach. Varying research methods were used in triangulation to correspond with the main objectives of the study. The combination of qualitiative and quantitative data analysis methods was necessary for a holistic analysis of results especially for language and cultural elements. The use of descriptive statistics was relevant in all phases. Statistical measurements were conducted using the SPSS versions 23, 24, 25 and STATA programs.

CHAPTER 5

RESULTS PHASE 1

5.1 Introduction

The following three chapters represent the results obtained in the three phases of the research process. The first phase was pre-testing, identification of indicators of language-based learning disability (L-b LD) and concept development as is reported below. The second phase involved tool development, the trials and modifications with the developed tool and is reported in chapter 6. The third phase was analysis of reliability and validity through an evaluation of the final draft of the tool for indicators of L-b LD as well as the repeated assessments with the tool and is reported in chapter 7. The main headings in the following three chapters 5 to 7 correspond with the objectives of each phase. The results provide a chronological view of the research process from pre-testing to the tool development stage and then to the validation stage. The results are both qualitative and quantitative in nature, reported in the form of tables, graphs and narrative descriptions.

5.2 Phase 1: Systematic Literature Review

5.2.1 Early Universal Indicators of Language-based Learning Disabilities

Effort was made to search for studies conducted in African countries and other countries that were considered to be similar to South Africa. There is a global focus on culturally fair assessments in multilingual contexts (Holding, Abubakar, & Kitsao-Wekulo, 2010). Therefore, research studies from Kenya, Brazil, India and China were considered to be appropriate as the circumstances regarding language and learning that are similar to South Africa. Research from the Unites States of America (USA), United Kingdom (UK) and

Australia were found to be relevant as these countries have advanced research, knowledge and experience with learning disabilities. The key words used in the search were:

The key words and search results are summarised below:

Table 5.1 Systematic Literature Review

Key word	**Google Scholar Journals**	**SAJCD**	**ASHA Journals**
Learning disabilities in Africa,	11 100	13	26
L-b Learning disabilities in Children, Africa	10 100	13 (same articles as above)	5 291 (including articles on AAC)
Predictors of learning and reading disabilities, children	71 600	4	546
Second language learning, Africa	12 600 000	34	1 572
SLT and 2nd language in Africa	55	34 (same as above)	89 (+Aphasia and Adults)
IsiZulu and L-b LD	642	11	1 (+ Autism)
IsiZulu language and culture.	1 500	20	14 057
Standardised speech and language assessments	486 000	16	41
Bilingual language assessment or test	148	23	3 372
Specific learning disabilities	6 760 000	289	1 471

The literature review identified the universal early predictors of L-b LD. The following Table 5.2 is a summary of indicators of L-b LD found to be universal and were relevant to learners in primary school as applicable in this study. The objective of this phase was to determine whether the universal indicators could be applied to isiZulu language and if they could be reliably extracted through a language assessment tool.

Table 5. 2 Universal L-b LD Indicators

Learning Area	**L-b LD Indicators**	**Corresponding Sub-tests of the Bilingual Battery for L-B LD**
Listening skills	Attention and associated behaviour; Social interaction or self-regulation during testing (Courter, 2010);	Behaviour assessment checklist Following directions in English and isiZulu.

	Following directions; Short term memory.	Immediate recall of letters, digits and words.
Speech and language development	Vocabulary size and knowledge; Verbal Comprehension (Gottardo, Collins, Gebotys, & Baclu, 2008); Pseudo word repetition; Phonological awareness (Weinrich & Fay, 2007).	Word association; Repeating words; Phonological awareness.
Reading	Phonological awareness (Gilbertson & Bramlett, 1998); Phonemic awareness (Snowling, Bishop, & Stothard, 2000); (Burns, 1995). Word recognition (Courter, 2010); Semantic and metacognitive skills; Working memory (Alloway, et al., 2005b); Oral language skills (Murphy, 2007).	Phonological awareness; Story comprehension; Reading and doing; Letter awareness; Repeating sounds, words, numbers, backward naming.
Written language and spelling	Phonological awareness (Weinrich & Fay, 2007); Short term memory (Baddely, Gathercole, & Papagno, 1998); Spelling (Weinrich & Fay, 2007).	Phonological awareness; Letter awareness; Repeating sounds, words, numbers, backward naming.
Numeracy and language processing	Verbal short term memory; Working memory; Rapid Automatized Naming; Spatial reasoning (Kleemans, Segers, & Verhoeven, 2011); Numeric processing skills (Alt, Arizmendi, & Beal, 2014); Auditory temporal processing; Rhythmic sensory processing (Sullivan, Popp, & Raphael, 2011).	Recall of sounds, words, colours, backward naming; Math vocabulary, Math problem solving, Word sums.

The literature review did not provide information that linked specific L-b LD indicators to certain locations, languages or cultures. There were insufficient South African data to make such an assumption. However, universal indicators were confirmed in some psychology and learning disability studies (Gottardo, Collins, Gebotys, & Baclu, 2008; Segalowitz & Gruber, 2014). From some of the African based studies assumptions can be made about the relevance of these universal indicators to African populations. However, one needs to be careful in applying data to all language groups.

5.3 Pre-Testing with Available Tools

Ten bilingual learners were selected using purposeful random sampling from an urban, English medium school for assessment using the Clinical Evaluation of Language Fundamentals (CELF-4 UK) (Wiig, Secord, & Semel, 2004) and the Phonological Awareness Test (Robertson & Salter, 1997). The learners ranged from the ages of 6 to 10 years. The seven boys and three girls were in grades 1, 2 and 3. The learners were identified for assessment by their class teachers and consent was obtained from their parents. The learners had no prior cognitive or intellectual assessments. However, some were suspected by their teachers to have learning difficulties.

The pre-testing phase was used to determine three factors. Firstly, the contextual and cultural issues that impact on the learner's language test performance; secondly, the linguistic factors that needed to be considered in the administration of the tool; thirdly, the test constructs that were relevant for L-b LD and appropriate to South African learners. The results are as follows:

5.3.1 Contextual, Environmental and Cultural Factors

The following observations were made in order to identify influential factors in the language assessment of isiZulu-English speaking learners in the foundation phase:

5.3.1.1. School culture

School culture was analysed through the educators' interviews, level of parental involvement as well as learner behaviour. The educators at this pre-testing school stated the following challenges:

a) There was poor parental support when learners require additional classes or therapy,
b) There was lack of cooperation in completion of homework.

Other urban fee paying schools in the same city are able to subsidise services from a resident social worker or a visiting speech therapist for needy students. The school's ability to provide additional services may have a direct impact on the learners' performance, their attitude towards their weaknesses, realisation of the learner's potential and parental support. The availability of such privileges has implications for the school culture. The implication for the main study was that it needed to determine if the school culture indeed had an influence on the findings. The implication for the tool development was that it needed to accommodate differences in school cultures and needed to be neutral in its assessment of learners from different socio-economic backgrounds.

5.3.1.2. Teaching Methods

South African primary schools use the Curriculum Assessment Policy Statements (CAPS) syllabus as prescribed by the Department of Basic Education. However, in the pilot school, teachers were observed to have different approaches to the sequence of the syllabus and the use of additional supporting materials. The following observations were made:

a) Teachers seemed to be guided by the materials available from the library in their school to decide about the sequence of the syllabus.
b) The teachers within the same school and grade used different teaching methods, curriculum sequence and materials.
c) The teachers bought their own additional teaching tools, games and reinforcement materials.
d) The proficiency in the English language for the students as well as the educators varied remarkably from one class to another.
e) Learners from different classrooms in the same grade were found to be at different levels of learning in their phonics and literacy skills.

The different approaches and methods used by the teachers may have had either a limiting or promoting effect on the learners. For example, the maturity level of phonological awareness, concepts; following directions and word classes may have been affected by use of educational computer programs which some of the teachers used.

5.3.1.3. Learner's age

The results indicated that the range of scores on the language test did not appear to relate to the learners' age. The learners' performance (scores) did not seem to improve or decline with age. The youngest learner was a female in grade 1, aged 6 years, 10 months, performed the best in three of the subtests. Therefore, it appeared that there was another factor rather than age that influenced performance.

5.3.1.4. Gender

The results did not reveal any gender bias. This variable needed to be evaluated in the main study as the number of participants in the pilot was too small to reveal any pattern.

5.3.1.5. Grade Level

The expectation was that the learner's grade would positively influence performance on subtests like the phonological awareness, indicating maturity in higher classes. However, this was not the case as the best performing learners in the phonological awareness subtest were in a lower class and younger. The learner in grade 1 performed better than the learners in grade 2 suggesting that there were additional factors to grade that also had an impact on performance. For example language skills and teaching methods.

5.3.2. Linguistic Factors

The CELF-4 (UK) was administered in English to isiZulu speaking learners attending an English medium school in northern coastal region of kwaZulu-Natal. There was an expected language delay in English because it was the learners' second language. The purpose of my observations was on determining the subtests that would adequately identify language related difficulties and difference. The learners had mostly attended a grade R class in English at their school, giving them an additional year of exposure to English. The results indicated the following regarding language experience:

a) Learners who reported to use English at home had better English vocabulary. For instance, a learner of 6 years 10 months, with 4 years of English experience (3 years in pre-school) and who consistently used English at home, who was fluent in isiZulu, had the highest score in *formulated sentences*.
b) Learners with adequate English vocabulary and flexibility in using both the home language, isiZulu and the language of learning and teaching (English) achieved higher scores than the ones with inadequate language skills in English.
c) The quality and extent of the learner's exposure to English had an impact on their performance on expressive language sub-tests such as the *formulated sentences* and *recalling sentences* subtests.

5.3.3 Test constructs

The findings indicated the following regarding the language skills tested using the CELF 4:

a) The *number repetition* subtest was perceived to be the most difficult for all but one learners tested. Nine learners performed at the age equivalent of 5 years according to the available test norms regardless of actual chronological age. Only one learner's score matched the age appropriate range of the standardised norms in this test
b) Participants performed poorly in *number repetition* regardless of their age, grade or gender.

The reasons for the weaker scores in sequential memory tasks was linked to inadequate language skills in English, lack of exposure to memory tasks of this nature, or a generally different approach to teaching and learning. It is also possible that cultural differences were at play. The implication was to further look into the variables at play such as culture, experience, teaching methods as well as the possibility of the influence of cognitive factors on language memory, language processing or auditory perceptual skills in the main study. Due to the limited number of participants involved in pre-testing, the findings on linguistic and cultural factors that impact on the results needed to be confirmed with a bigger number of participants.

Three of the ten learners who had performed poorly were selected for repeat testing after a period of two weeks. The learners were initially tested with the CELF-4 (UK) test without translations and precise use of testing materials provided. In the second testing session the instructions were provided in isiZulu and repeated where needed. The accommodation assisted the learners to understand the tasks and gave them the confidence to perform at their best. For the *following directions* subtest, the directions were repeated to allow the learners an opportunity to first understand the English vocabulary in the instruction and then process the

information required for the instruction. Figure 5.1 illustrates the results of the *following directions* subtest.

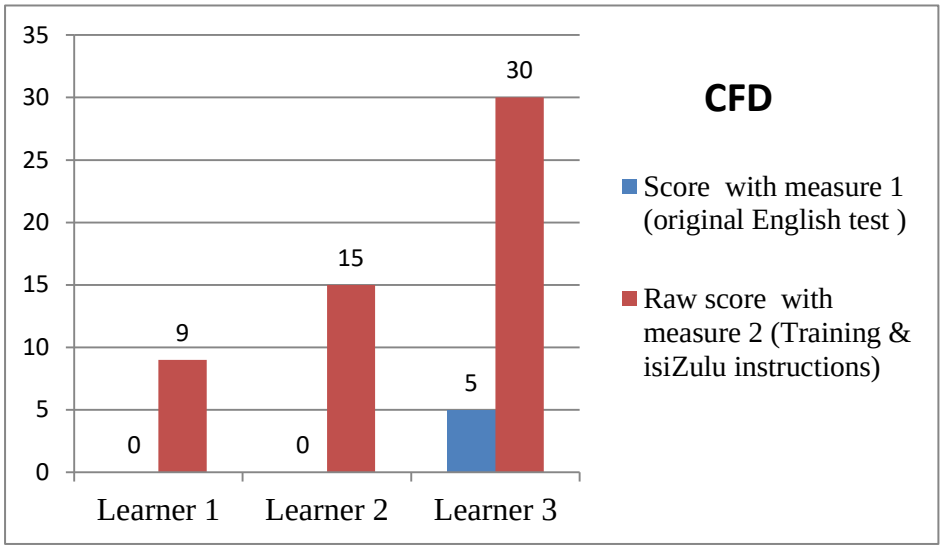


Figure 5. 1 Pilot Study Results- Concepts and Following Directions

Figure 5.1 reflects that when the test was re-administered and the instructions provided in isiZulu, the learners' performance improved in the *concepts and following directions* test. In the *word classes* subtest all learners understood the instructions on the first attempt. The learners were provided with an opportunity to practice the concept of categorizing and were able to associate words at a concrete level before starting the test. The *word classes 1* subtest was used for all 6 to 9 year old learners. The results showed improvement in the scores compared to the first test session.

The following Figure 5.2 displays the results.

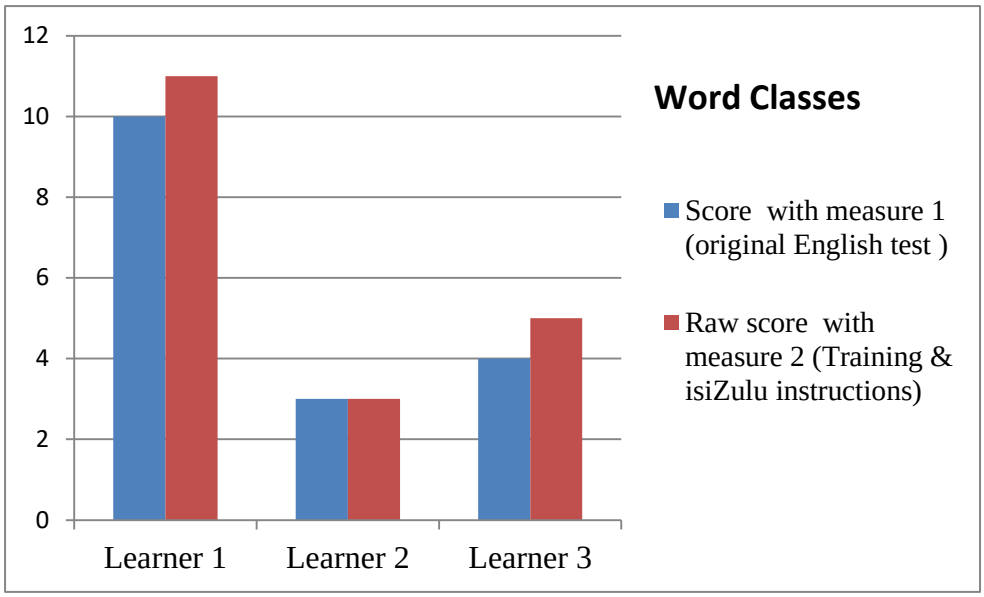


Figure 5. 2 Pilot Study Results-Word Classes

Figure 5.2 reflect that the scores of the second test session were improved but still below age appropriate levels compared to the standardised population. It is possible that test memory provided an advantage for the learners.

The recalling sentences subtest involved English test items. The scores on the second trial of the test improved for 2 learners, and remained the same for learner 1. The following Figure 5.3 displays the results obtained from the *recalling sentences* subtest.

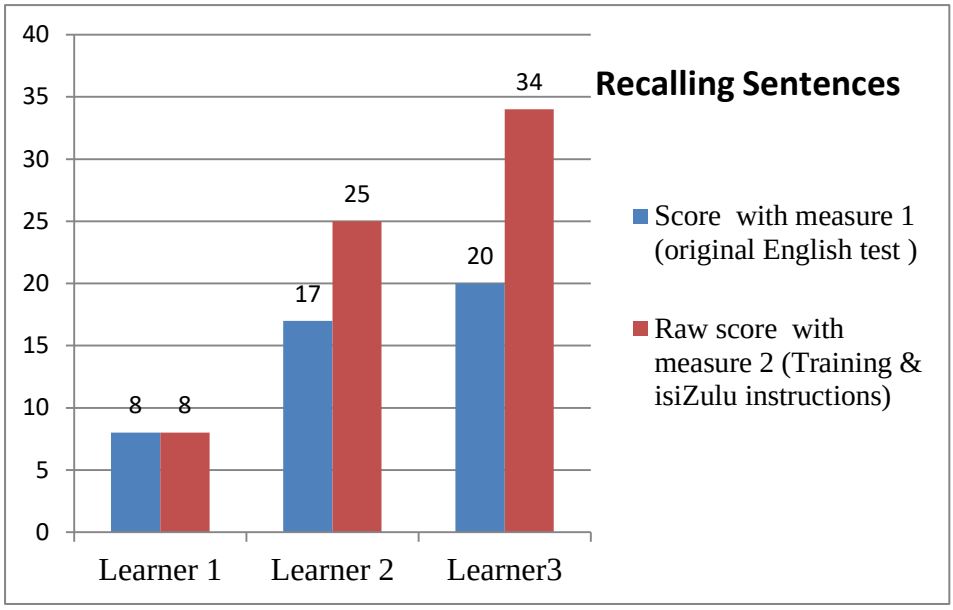


Figure 5. 3 Pre-testing Study Results -Recalling Sentences

Figure 5.3 reflects that there may have been a test memory advantage for the learners. Additionally, familiarity with the task may have provided a learning experience.

The *formulating sentences* subtest required learners to use the pictures provided to build descriptive sentences. There was a marked improvement in scores for learners 2 and 3 but not for learner 1. Pre-testing results demonstrated that the subtests *formulating sentences* and *recalling sentences* require adjustments to vocabulary choices, grammar and administration in order for it to be appropriate for these learners. It facilitated evaluation of the underlying target skill not just English language competency. The results in Figure 5.4 indicate the results of the *formulating sentences* subtest.

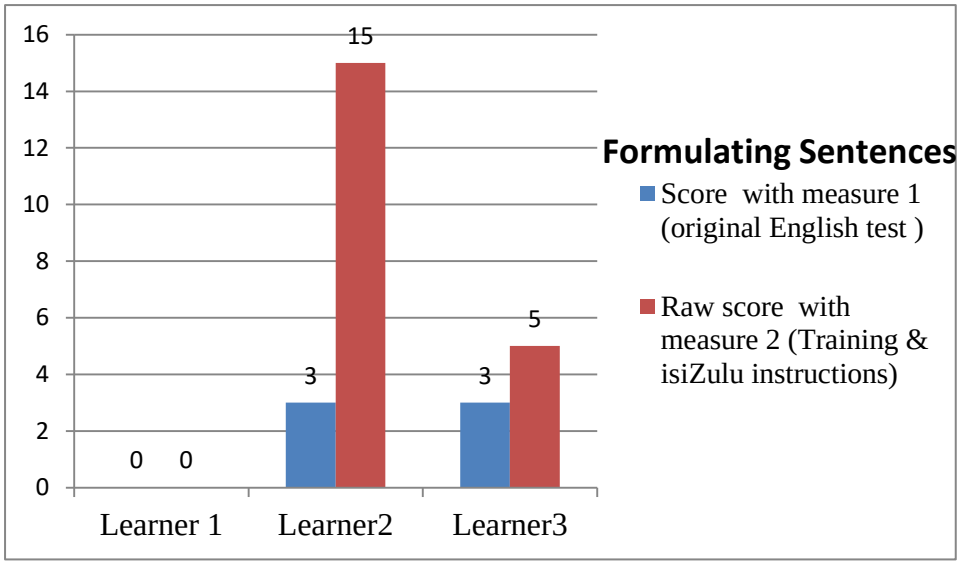


Figure 5. 4 Pretesting Study Results - Formulating Sentences

Figure 5.4 illustrates that learner 1 did not achieve a score on the test in both sessions. Translating the instructions proved to be beneficial for subtests including the test of repeating numbers

5.3.4 Phonological Awareness Test construct

The results from the Phonological Awareness Test (PAT) (Robertson and Salter, 1997) indicated that the majority of the learners (90% or 9 out of 10 learners) could not produce rhyming pairs in English. However, 20% could identify rhyming pairs when provided with options. The learners indicated that they were not familiar with the task. The additional demand to produce rhyming pairs in English probably contributed to the poor response despite availability of practice items.

The pre-testing with the PAT also showed that the majority (80%) of the learners could isolate beginning, medial and ending phonemes. Isolation was a familiar task and learners in all grades performed well in isolation of beginning and ending sounds. The blending and substitution subtests presented as a challenge for the learners at phoneme level. Learners

generally found it difficult to substitute vowels without the aid of writing and found it extremely difficult to substitute phonemes using counters.

Segmentation was found to be a fun-filled and easy task to learn. The most successful trial item for segmentation was the learner's own name, especially if it was in isiZulu. Learners without experience of segmentation could easily complete the task correctly at sentence and word levels after demonstration. The learners had to be provided with a teaching experience in order to participate meaningfully in the test because it was in English. Segmentation at sentence level was found to be challenging for learners who were also observed to have poorer English vocabulary. The observation of responses demonstrate that learners applied isiZulu language structure, which has single vowel based syllables, when segmenting English utterances. The use of isiZulu grammatical structure resulted in simplification of segmentation and provided with incorrect results. There appears to be a link between vocabulary and segmentation at sentence level.

5.4 Summary and Conclusion for Phase 1

The pre-testing results assisted the researcher to make decisions regarding the type, methods and layout of subtests to include in the proposed L-b LD language tool. The pretesting results demonstrated that the learner's general language abilities in English had an impact on their performance in the CELF 4. The results also illustrated that offering teaching experiences and repeated trials alters the learners' performance and offers valuable information about the learners' potential to learn. Phonological awareness tasks such as rhyming, blending and substituting phonemes in English were unfamiliar and challenging tasks for the participating learners. Isolation and segmentation were familiar and achievable. The use of isiZulu instructions was found to be helpful for the learners.

CHAPTER 6

RESULTS PHASE 2

6.1 Introduction

The second phase of this project entailed development, trials and modifications to the developed tool. The procedures in the second phase included creation of the tool blueprint, the research assistants' workshop, pilot study at trial site, field trials with the developed tool, ongoing evaluation and modification to the tool drafts. The qualitative and quantitative results are provided in this chapter.

6.2 Research Assistants

Five research assistants were interviewed, accepted for training and assigned roles. The training workshop occurred over five days and monitoring continued after the pilot study. The training workshop was practical, included observations and mock testing conducted by the researcher. It ensured the assistants were familiar with the data collection tools and methods. The routine and logistics for the research assessments was discussed. The attendance register is attached in Appendix X. The research assessment process as well as the data collection tools were piloted in school A.

6.3 The Pilot Study Results

The pilot study involved 12 learners in grades 1, 2, and 3 from a mainstream, urban primary school. The school is hereafter referred to as school A as it is also the first school in which the trial took place. Notable results from the pilot study were that the majority (75%) of parents considered their children's language abilities to be adequate and 60% suggested that

teachers would know better in this regard. The parents suggested that the teachers would have a more realistic view of the language and learning capabilities in the fields of reading, writing, spelling and comprehension than parents. This finding challenged the initial proposal to utilise the parent's opinions in identifying learners with language-based learning disability (L-b LD). Fusing the questionnaires to a single document filled first by parents then by the teachers in separate columns was thought to be the solution. Both responses were then noted in the analysis of reported difficulties. However, the teachers' responses were considered more reliable in identifying the likelihood of L-b LD. The comparative analysis of the teachers' and the parents' responses also assisted the researcher have a complete view of the learners.

6.4 The Development Process of Bilingual Language Tool

The newly developed language tool is referred to as the Bilingual Battery for Language-based learning disabilities (BBL-BLD). The tool development process is explained in detail in the methodology chapter 4 (see the phase 2 data collection methods in chapter 4). It is summarised in the following table for ease of reference. Table 6.1 reflects the final selection of tool constructs that were the utilised in the tool. The definition of terms is described in the table as well as the language of choice for assessing each skill.

Table 6. 1 Tool Constructs and Purpose

Subtest (Construct)	**Description**	**Purpose of the Test**	**Language of Testing**
Section A: Listening Skills	**A1. Following auditory directions (English)** 10x directions 10 x sets of pictures **A2. Following**	To evaluate the learner's ability to follow instructions in English and in isiZulu. To evaluate and compare understanding of some basic concepts such as number systems, before or after, shapes, patterns, colours, directions and positions.	Bilingual English and IsiZulu

	auditory directions (isiZulu) 10x directions 10x sets of pictures		
Section B: Language Skills	**B1. Story comprehension** 12 items ; graded No Pictures **B 2. Word association and reasoning** 20 items Not graded	To evaluate the learner's ability to understand the story in English and compare to his/her performance in isiZulu. By asking the questions in isiZulu the emphasis is on the learner's ability to understand the questions thereby demonstrating their true comprehension of the story. To evaluate the learner's vocabulary and the ability to associate the words appropriately into their categories. The ability to justify the choices demonstrates reasoning and comprehension of the words and their categories.	Bilingual assessment isiZulu and English assessment
Section C: Reading and Spelling Skills	**C1. Phonological awareness** 35 items Not graded **C2. Sound-Letter awareness** 4 items Graded **C3. Rapid automated naming** 3 items Not graded Time recording **C4. Reading and doing** 5 items	To assess phonological awareness using pseudo-words, application of letter awareness, decoding skills, analysis and synthesis for application in both isiZulu and in English. In this section the test items are pseudo-words words which can be pronounced with an IsiZulu or an English accent depending on the learner's language of instruction and the purpose of assessment. To assess the learner's ability to identify and fill in the missing letter in a word. To assess the learner's ability to rapidly name letters, pictures and read pseudo-words. To assess the learner's ability to read and follow written instructions.	Pseudo-words English or isiZulu assessment Assess in English or isiZulu

	Graded Time recording		
Section D: Working Memory	**D1. Repeating digits** **D2. Repeating letters and remembering colours** **D3. Repeating words backwards** **D4. Memory Capacity** 6 items per subtest Incremental progression	To assess working memory capacity that reflects applied memory to tasks that are currently active. To assess the ability to bring information to focus or maintain it in focus in the midst of distraction.	**Section D: Working Memory**
Section E Mathematic Concepts	**E1. math vocabulary** 10 items Pictures **E2. problem solving** 10 items **E3. word sums** 10 items	To assess the learner's vocabulary relevant for numeracy. To assess knowledge of words and concepts that are necessary for comparisons, measurements, contrasting and calculations**.** To evaluate the learner's ability to use logic, reasoning and communication in order to solve problems in the absence of mathematical symbols and signs. To evaluate the learner's ability to apply abstract mathematical concepts to real life situations, demonstrating skill in simple mathematical operations and vocabulary skills.	Test in English or isiZulu

My experience as a speech-language pathologist and a bilingual isiZulu-English speaker provided insights into administrative methods, time allocations and sequencing of tests. Test items were carefully formulated and written in English and isiZulu by myself. As a speaker of isiZulu with experience in language therapy, I was involved in simplifying the language to an appropriate level for the children's age groups. The independent translators then back-translated to English to verify the meanings and vocabulary choices. The first draft of the tool

was then forwarded to the 5 members of the Delphi review panel for criticism and improvements. After three stages of corrections and further adaptations for language and culture, an artist was involved to develop pictures for the tool. These were reviewed by the research assistants and found to be clear and culturally appropriate. The first official draft was then ready for administration for field trial in phase 2. The following observations were made regarding the administration and procedures of the tool in the pilot study:

a) *Administration time*: Testing time was recorded for all the testees in the pilot and the trial in school A. The average time taken to complete the language assessment was 45 minutes for grade 1 and 2 and 40 minutes for grade 3 learners.

b) *Assistant support*: Ongoing support to the research assistants was offered by myself as the principal researcher on site as I was not involved in assessing the learners. Support involved answering queries during testing, verification of possible answers where there were dialectal variations and making testing modifications as required.

c) *Pictures:* The illustrations used in the language tool were found to be generally clear and did not cause confusion when linked to the questions. However, minor changes were suggested by research assistants such as intensify picture colours, increase or reduce picture size.

d) *Subtests progression*: The progression of subtests was continuously modified for logical flow and transition during testing. Utilising the sequence of subtest reflected in the 5th draft (used in school E) facilitated an easy flow from one subtest to another. It ensured that the linguistic demands were in concordance with the test purpose (Johnstone, Thompson, Bottford-Miller, & Thurlow, 2008, p. 26). The progression of test items in each subtest were continuously verified through statistical analysis (normal distribution) as suggested in Johnstone, Thompson, Bottsford-Miller and Thurlow (2008:26).

e) *Scoring analysis:* The scoring system of allocating a 1 or 0 (zero) per item was found to be quick and easy. The error analysis column was suggested to provide a list of possible correct responses in order for the scoring to be uniform.

6.5 Linguistic and Cultural Adaptations

Participant consultation was used to gain insights into cultural appropriateness of the tool. The participants were the Delphi review panel; the trained research assistants; the artist with teaching experience at a remedial school, the primary school educators in trial schools and some parents. The goal of the participant consultations was to generate appropriate pictures and test items to measure different aspects of language-based learning disability. The following Table 6.2 provides information on the cultural considerations made in this phase. Consultations with the artist assisted in identifying child friendly drawings that would be acceptable for the age groups involved recognizing the local environment in KwaZulu-Natal. Use of natural colours ensured that the pictures were clear. Drawn pictures were found to be friendly and appealing to the target age group in the pilot study.

Table 6. 2 Cultural Adaptations

Illustrations Adaptation	**Method**	**Motivation**
Use of animated cartoons.	Consultation with a children's artist, Delphi Procedure.	Child-friendly pictures. What the picture portrays is immediately apparent.
Use of farm animals such as cows and dogs.	Artist consultation, Delphi procedure.	Familiar animals to both urban and rural children.
Mixed use of hand drawn and google picture art.	Delphi procedure, trial feedback from research assistants.	Clarity, matching of item-picture accuracy. Pictures depicting realistic people with both lighter and darker skin tones.
Translation and back translation.	Consultations with experienced translators,	Vocabulary choices acceptable in both urban and rural

	parents and research assistants as ordinary isiZulu speakers.	communities.
Generated items review.	Delphi procedure, therapists' focus group including SLTs and Occupational therapists.	Language, clarity and ambiguity assessment.

As a principal researcher, my background as an isiZulu speaker played a significant role in the understanding the language and culture of the learners. My experience as a speech-language therapist provided an insight into acceptable children's language behaviour as well as the parent's typical interpretation of these behaviours. I had an advantage of being a resident in the same urban area as school A, which provided familiarity with the general value system of the involved community. My understanding of the family relationships and the predominant cultural practices of the surrounding communities assisted in guiding the parents and teachers as to what could be considered "normal" language and behaviour. Information about cultural factors such as common beliefs, family structure, and relationships with children, communication styles, understanding of medical conditions and use of non-verbal communication and pictures was also acquired through participant consultations.

6.6 Tool Trials

The developed diagnostic tool, BBL-BLD, was put on trial at five locations, involving five schools and four drafts of the tests. The schools were selected to represent rural and urban locations; English versus isiZulu as language of learning and teaching (LoLT), as well as mainstream versus remedial type of school. The schools also varied in size, culture, socio-economic status and learner status of L-b LD. One remedial and four mainstream primary schools were involved. The initial study proposal did not consider the varying dialects of isiZulu in planning the distributions of schools that needed to participate. The study had to

later include a school in the Natal midlands and Durban metropolitan areas to correct this error. All participating schools are located in KwaZulu-Natal (KZN).

The profile of the learners and description of their schools assisted in understanding the results obtained and the modifications that resulted from the tool trials. The results displayed in the following graphs reflect the general performance of learners on the subtests of the BBL-BLD. The group scores on each subtest are reported per grade. The percentage of learners who attained the achievement score (50% or more) for each subtests are reflected in the Y axis while the subtests are abbreviated in the X axis. The schools are referred to in letters A to E in the sequence of the testing. Appendices A and B provide tables on tool construct definitions and subtest description which explain the abbreviations used in the subtests. It is crucial to note that the sequence of subtests and the abbreviations used in the figures below may not be uniform as there were variations during the modification process.

6.6.1 Results School A

The first approved draft of the newly developed language tool was administered to 58 learners in school A. The tool draft contained subtests that were mainly in English, excluding the two comparative tests (*following directions* in English and isiZulu and *reading* in English and isiZulu). However, all test instructions were provided in isiZulu. The learners were tested over a period of a week starting with the grades 1 then 2 and 3. The results displayed in Figure 6.1 indicate that the tool was received in a similar manner by the learners in grades, 1, 2 and 3. The general pattern was the level of performance generally improved as the grades and age increased.

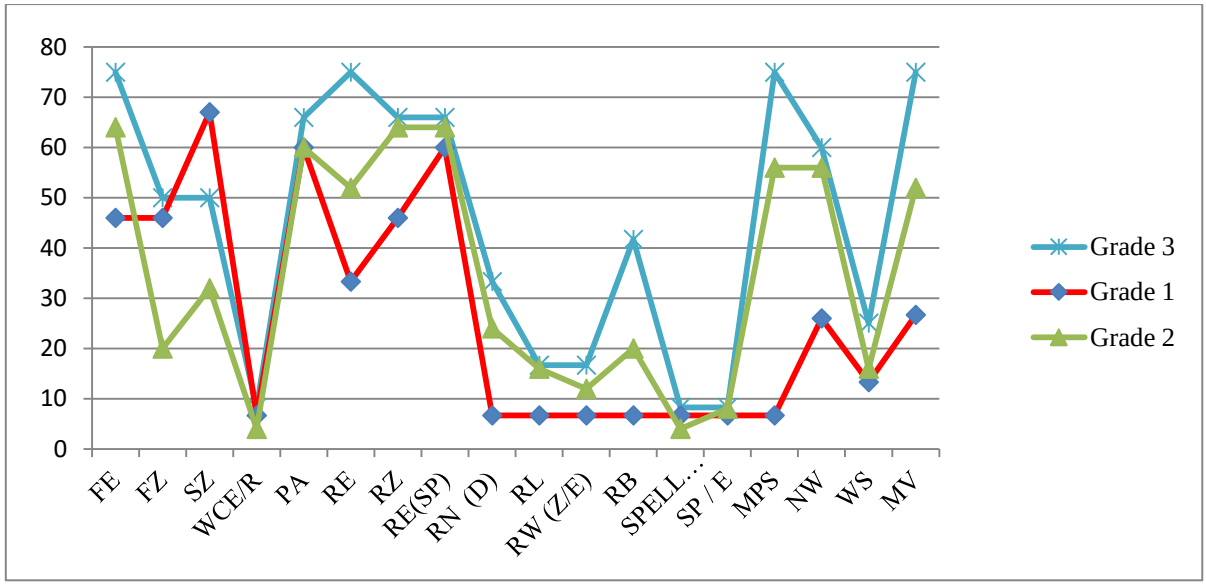


Figure 6. 1 School A Learner Performance by Grade

The results show that learners performed poorly in similar language tasks regardless of grades. For example, the performance on the *word structure* (WCE/R), the *memory* subtests: *Repeating numbers* (RN), *repeating letters* (RL), *repeating words* (RW), *backward naming* (BN) and the *word sums* (WS) were low for all grades. This pattern revealed possible issues to investigate regarding the structure, scoring methods or the subtest items of the tests involved. It also raised questions regarding the L-b LD indicators under investigation. Figure 6.1 also illustrate that the grade 3 learners generally performed better in all but one subtest of the tool in this school. The learners in grade 3 performed below learners in grade 1 in the *story comprehension* subtest (SZ). There were two possible reasons for this finding. Firstly, the stories were graded and adopted from nursery rhymes and the grade 3 story may simply have been too difficult to understand. Secondly, the stories were relayed in isiZulu and grade 1 learners may have been more in touch with their isiZulu language than grade 3 learners.

It was interesting to note that the scores for *following directions* in English were higher than the isiZulu version for learners in all grades in this school. The performance of learners on tasks relating to sequential and working memory (RN, RL, RW, and RB) was low for all

grades. The *spelling* subtests (SP/E) were substantially low for both isiZulu and English for all grades. The teacher feedback discussion reported that this spelling competency was not expected to be achieved in the first quarter of the year for grade 1 learners. This factor did not explain the poor performance by grades 2 and 3 learners. The tool items and the L-b LD indicators on target had to be evaluation further for modifications.

6.6.2 Results School B

School B was located in an informal township or peri-urban area. This mainstream school had adopted English as its LoLT despite the fact that all learners and teachers were first language isiZulu speakers. The pilot study at this school indicated that learners in grade, 1, 2 and 3 were not competent in English as they found it difficult to follow instructions and communicate in English. Hence, the learners in grade 3 were not assessed in both English and isiZulu but selected which language they wished to use. All learners in grades 1 and 2 were assessed in isiZulu. The following graph in Figure 6.2 reports on the performance of the 141 participants. The percentage of learners who achieved the mean or achievement score of 50% of more for each subtest administered is reported. The result in Figure 6.2 indicate that the level of performance generally improved as the grades and age increased in this school.

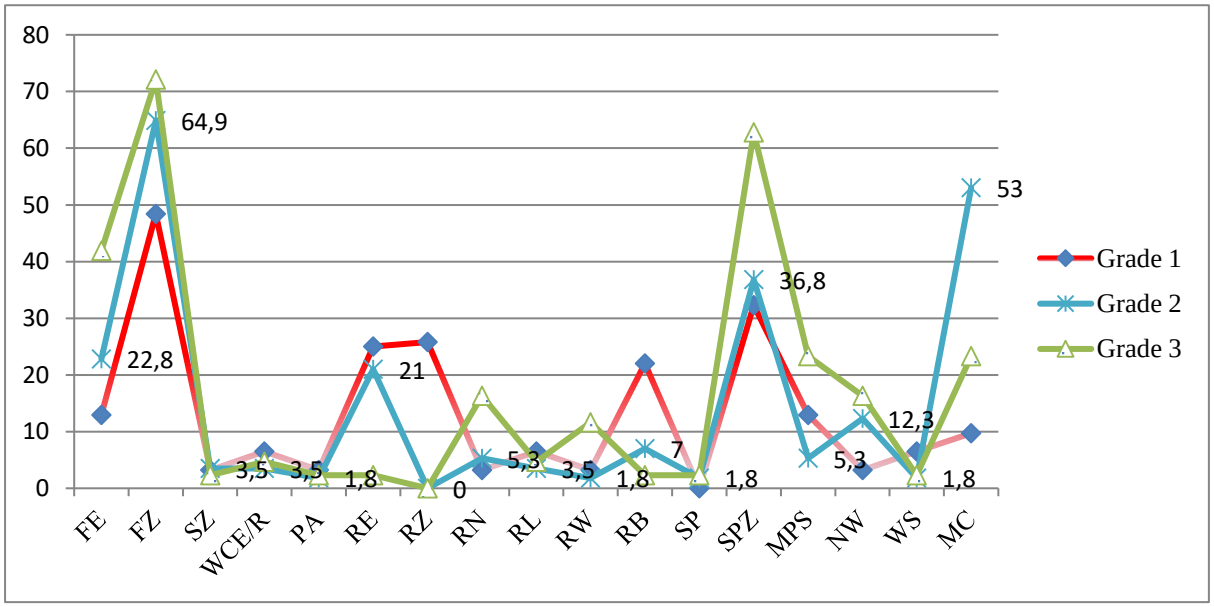


Figure 6. 2 School B Learner Performance by Grade

It is noteworthy that despite the use of translated subtests, the achievement level for most subtest were below scores obtained in school A. Interestingly, the results indicated that Grade 1 learners outperformed both grade 2 and 3 in *reading* tests (RE and RZ). The performance in the following subtests were considerably low: *language* (WCE/R), *phonological awareness tests*, the sequential memory subtests (RN, RL, RW, and RB) and the numeracy based language subtests (NW and WS). The best scores were obtained for *following directions* in isiZulu (FZ) and s*pelling* in isiZulu (SPZ). The *phonological awareness* subtest at this stage had a combination of English and isiZulu words which proved challenging for learners. The first challenge was that phonological awareness tasks included English words. It was difficult to determine whether the learners were following isiZulu or English language rules in deciding the answer. The second challenge was the learners were not familiar with the nature of the tasks used, for instance, phoneme isolation and blending. These challenges were reported to the Delphi panel for review and tool modification.

6.6.3 Results School C

The adapted second draft of the tool was administered to school C. This school is categorised as a remedial school for learners with special educational needs. It is the only such school in the area, servicing the whole education district. Learners at the school are initially assessed by a team of SLTs, occupational therapists, remedial educators and psychologists prior to admission into the school. Therefore, all learners admitted have been diagnosed with a form of L-b LD. Consent letters were sent to all 48 parents of learners who speak isiZulu as a home language and questionnaires were all co-filled by the teachers, a 100% return rate was achieved. The percentage of learners who achieved a minimum pass score (50%) are displayed in Figure 6.3.

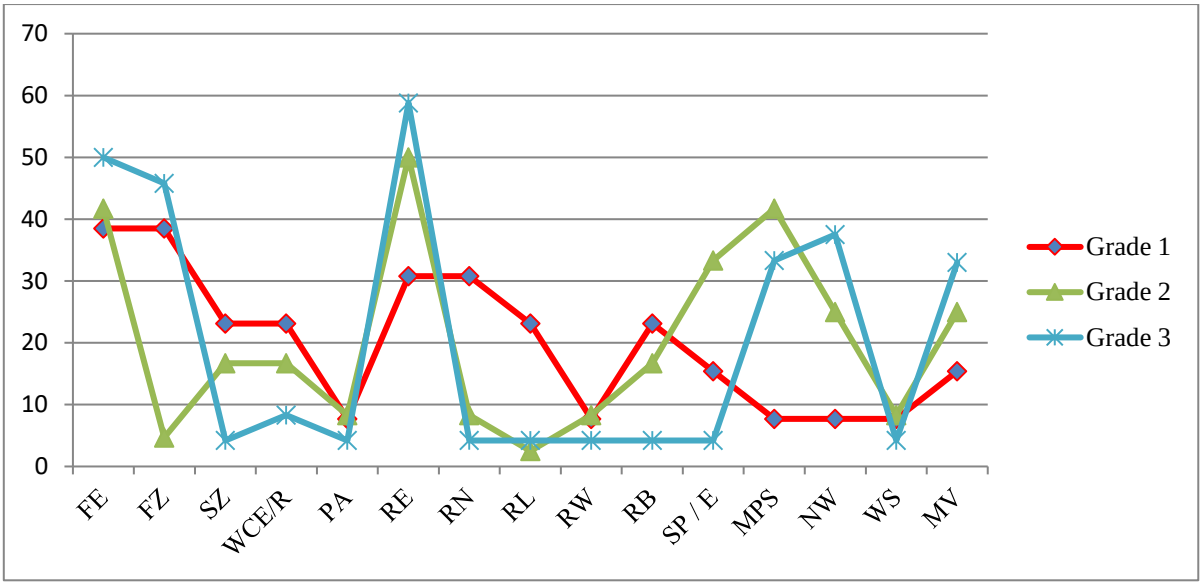


Figure 6. 3 School C Learner Performance by Grade

The general pattern of the findings in school C indicated progression. The results for grades 1, 2 and 3 showed consistency in how the test was received by the learners. The pattern of low and high scores were generally similar to the previous schools A and B. The impression that performance in *sequential memory* and *working memory* subtests were low remained. The mean scores were as high as 20 to 30 points in *repeating numbers* and *backward naming* respectively, for grade 1 compared to school A and B. Additionally, all learners achieved better scores in *math vocabulary* (MV) when compared to *problem solving* (MPS), *number words* (NW) and *word sums* (WS) revealing an imbalance in the general layout of the tasks, particularly for younger participants.

The performance of grade 1 learners on the non-graded numeracy-based language tasks were lower than grade 2 and 3. It was noted that the language, grammar and the phrasing used in these test was difficult for grade 1 learners. The grade 3 group performed the best in *following directions* in both English and isiZulu as well as in *reading* scores. Grade 3 learners performed better in their graded reading task perhaps because of their age and experience. Their performance was still below expectations as only 60% of learners achieved 50% or

more on this test. Grade 3 learners also found the *memory* tasks, *phonological awareness,* and *story comprehension* tasks to be difficult. Memory tasks were better tolerated by grade 1 and 2 learners of this school compared to learners in the previous two schools. The performances in these tasks became a source of concern for the review panel.

6.6.4 Results School D

School D was a rural based school, situated in the outskirts of a KZN midlands town. It was located away from the shopping amenities and in an area short of water, electricity and tarred roads. The school uses isiZulu as LoLT however, learners take English as a second language subject from grade 1. The pre-assessment session with the school management team revealed that the school constantly identifies learners who have difficulties in reading and writing in English. The learner's abilities in English tasks was important since all learners in grades 4, 5, 6 and 7 use English textbooks and learn through English in all content subjects. There is an expectation for the learner to become bilingual by grade 4. The trial of the language assessment tool in this school indicated the following results:

That learners performed best in the *following directions* test, the *reading* test and the *spelling* subtests in isiZulu. The results in Figure 6.4 show that the patterns of scores obtained from the learners at this school D were comparable to the English medium schools A, B and C. This finding reflected the consistency of the tool's constructs regardless of language used. The results from the bilingual subtests revealed that learners performed better in the isiZulu version of the *following directions* and *story comprehension* subtests than in English. The results in Figure 6.4 illustrate that there were substantial differences between the sum of FZ and FE scores for all grades. On the contrary, for the *reading* subtest the learners performed better when reading in English (RE) than in isiZulu (RZ).

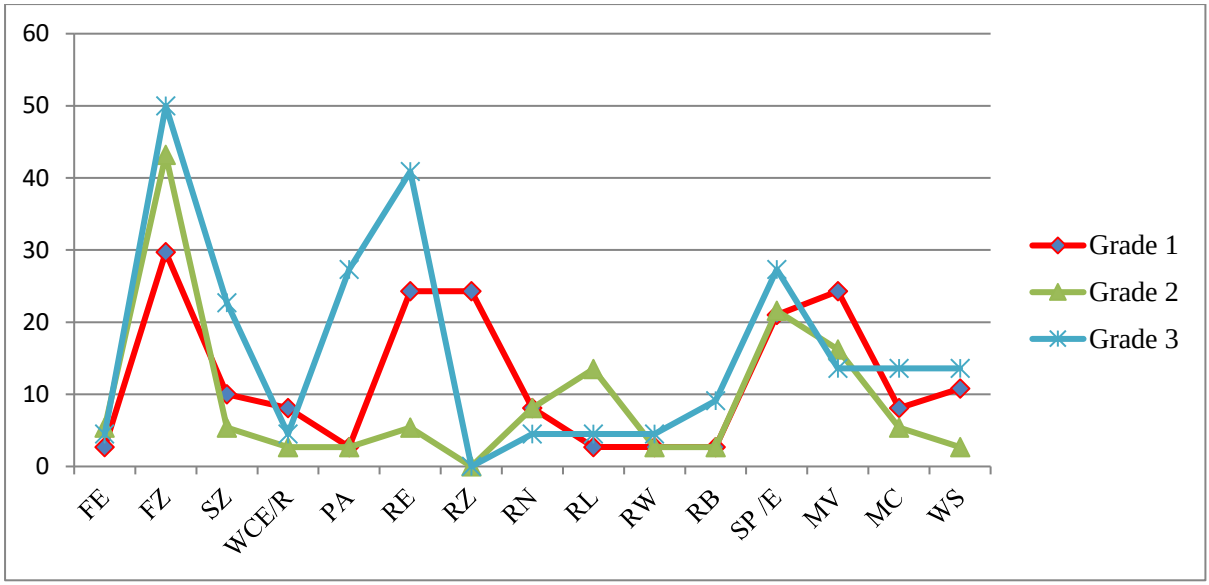


Figure 6. 4 Schools D Learner Performance by Grade

The findings from school D were similar to schools A, B and C regarding the *sequential memory* and *working memory* tasks. The performance on RN, RL, RW and RB were amongst the lowest scores across the grades. The scores for *word association* and *phonological awareness* were also poor despite using isiZulu instructions, trials and test items. The performance in the three numeracy-based language subtests marked MV, MC and WS was found to be lower than the previously tested schools. This was an interesting finding as the testers provided the instructions and test items in isiZulu in this school.

6.6.5 Results School E

The modified fourth draft of the language assessment tool was administered to school E. In retrospect, this school was the most representative of the five schools in terms of learner profile, socio-economic status and L-b LD abilities. This mainstream school is located in a sub-urban area within the Ethekwini Metropolitan. It caters for learners in the sub-urban area in which it is located as well as the nearby township and rural communities. The learner profile at the school was African, Indian and Coloured. The teachers also fitted this racial profile. The isiZulu speaking participants who met all the inclusion criteria took part in the

study. The school used English as LoLT for all grades. There were 91 participants from this school, their results are illustrated in the Figure 6.5.

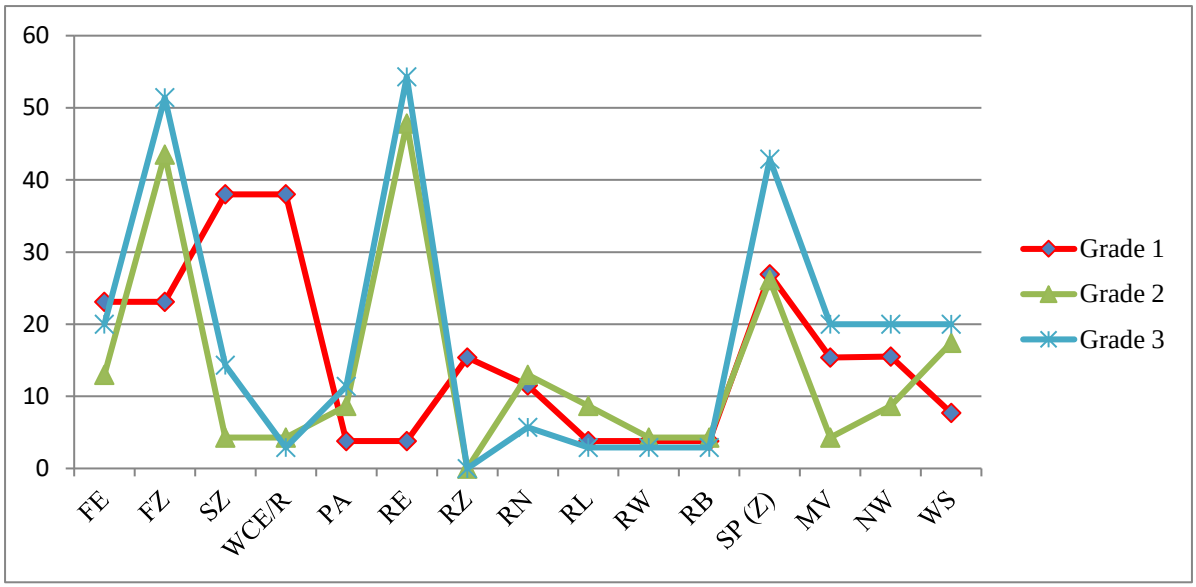


Figure 6. 5 School E Learner Performance by Grade

The results indicated that the learners generally scored high in the *following directions* subtest in isiZulu, *reading* in English and *spelling* in isiZulu than other subtests. There was a substantial improvement in the *following directions, story comprehension* and *reading* subtests. Figure 6.5 demonstrates that the performance of grade 3 learners in most instances superseded those of grades 2 and 1, indicating adequate cognitive progression of tasks and maturity in responses. The scores were lower in the *sequential* and *working memo*ry tasks (RN, RL, RW and RB) which was consistent with the results from the other schools despite the vocabulary, scoring and progression adjustments made to the test items. The Delphi panel considered that the lower scores might have been an indication of the inappropriateness of the working memory construct and questioned the validity of memory tasks as an indicator of L-b LD in the target population. The *following directions in isiZulu* (FZ), *reading in English*

(RE) and *spelling* (SPz) consistently reflected peak performances in all schools. The three tests reflected a good comparative analysis of English and isiZulu.

6.7 Tool Modification Process

Tool modification occurred immediately at completion of the learner assessments in each school. The observations of the principal researcher, the impression of the testers and analysis of learner performance and Delphi panel review contributed in administrative and item pool modifications. The tool was initially designed to be in English with a few subtests including isiZulu words and some isiZulu subtests as alternatives. The trial demonstrated that it was necessary to assess the learners in both languages in all five learning areas to have a full view of their language and learning abilities. The evaluation of the tool continued after completion of trials in school E as indicated in the following Figure 6.6.

A critical modification that occurred after trials in school A was that the tool subtests had to be translated to isiZulu language because of differing levels of competency in English. It was important to preserve the content for a comparative assessment to be possible. Subtests that were referred to the translating team were the *word association*, the *spelling* and *reading* tests and administered in isiZulu. The Delphi panel advised that it was necessary to assess tasks in isiZulu for the reading and spelling tasks as information about the learner's skills in English was already known to the educators, but the learner's abilities in isiZulu was not known.

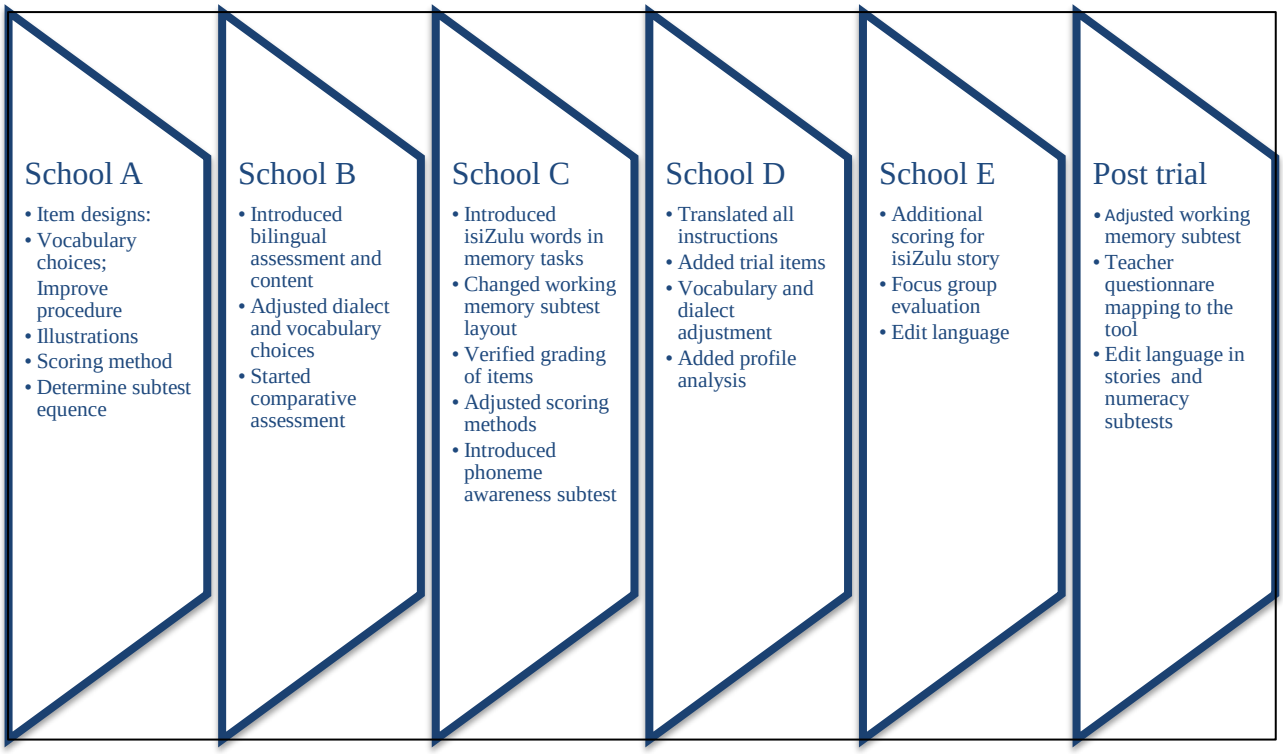


Figure 6. 6 Summary of Tool Modification

The findings from school B highlighted the conflicts regarding the language of assessment. The learners' first language was isiZulu and their LoLT was English. It was clear that assessing the learner's academic abilities in LoLT alone did not offer a realistic reflection of the learner's abilities. The subtests that included comparative assessment indicated significant discrepancies in scores obtained in isiZulu versus English. Therefore, the choice of items, complexity and vocabulary choices in both languages had to be thorough.

The major modifications after trials with school C were adjusting the level of difficulty so that it is incremental for each item, picture, task, and for each subtests. There were additional vocabulary adjustments to allow for dialectal changes. An isiZulu *word recall* subtest was added to the memory subtests in order to introduce familiarity in addition to the digit and letter recall. The *spelling* subtest was replaced with a *phoneme awareness* and *Rapid Automated Naming* tasks as part of assessing written language skills. The tables in

Appendices C, D and E provides more details regarding the cycles of item pool modifications.

Modifications to vocabulary items were made to accommodate the dialectal and cultural shifts at school D. Although the school used isiZulu as an official LoLT, the learners from this school were gradually introduced to English from grade 1 and taught only in English from grade 4 onwards. Modifications to the language tool considered the sequence and progression of the subtests for each grade. The expectations from the tool was early detection of specific L-b LD indicators in both languages. The reader is referred to the cycle 3 item pool modifications in Appendix E for an extended analysis of other linguistic and cultural modifications made at this point.

In school E, the process involved in large scale research assessment was well coordinated by the research team. The steps involved such as: pre-assessment meeting with the school management team, teacher briefing session, hearing screening, learner organisation and language testing proceeded smoothly. The assessment observations, tester evaluations and post-trial Delphi discussions all indicated minimum need for modifications in the fourth draft of the language assessment tool. This confirmed that the proposed tool had reached a satisfactory level in terms of linguistic and cultural modifications, the administrative procedures were fair and allowed for a representative assessment of the learners. The time taken to complete the tests was an average of 45 minutes and the results were generally consistent with the other four schools. The therapists' focus group assisted in evaluating the tool by trying it to some of their students in practice. They reported on the tool's reception and its possible weaknesses. The item pool, instructions, story comprehension and working memory subtests were then finalised for the reliability and validity analysis in phase 3 presented in the following chapter.

6.8 Delphi Panel Results

The Delphi panel included 2 speech-language therapists with experience in remedial school settings, 2 speech-language therapists with experience in research related to language test evaluation and development at a doctoral thesis level, 1 clinical psychologist with extensive research experience in developmental psychology in Sub-Saharan Africa and cognitive test development and 1 African languages expert. The Delphi panel discussions occurred through four rounds of digital discussions guided by questionnaires. These were facilitated by electronic and telephonic communication. The following table provides a summary of guidelines that were contributed by the observations and feedback in the trials and from discussions with members of the Delphi panel:

Table 6. 3 Delphi Guidelines for Language, Culture and Tool Structure

Linguistic guidelines	a) Use original tool items. b) Hearing screening for all participants c) Pseudo-words, to follow isiZulu and English language rules. d) Bilingual assessment of listening, expression, reading and comprehension tasks. e) Use experienced independent translators within KZN. f) Avoid translation of English rhyming pairs. g) Vocabulary choices based on graded CAPS books h) Translation and back translation of all items
Cultural Guidelines	a) Ensure use of research assistants who are 1st language speakers of isiZulu. b) Extensive piloting of the tool. c) Test learners in their familiar school environment, during school hours. d) Consider preschool experience. e) Consider experience in English as L2 f) Behaviour assessment considering the learner's general communication demeanour, attention and level of interest. g) Further research regarding rhyming in isiZulu. h) Use original pictures for the tool influenced by local culture and behaviours. i) Use of familiar animal characters, for an example, cows, dogs.
Structural guidelines	a) Conduct preparatory pre-testing. b) Exclude direct spelling testing and reading.

	c) Use pseudo-words for phonological awareness. d) Transcribe learner responses in word association. e) Use accurate and quick scoring system. f) Eliminate rhyming testing for the target age group. g) Mixed use of hand drawn and google clipart pictures for clarity, matching of item-picture accuracy

The Delphi panel reached 100% consensus in the use of comparative English and isiZulu language testing. The Delphi panel also reached consensus on the relevance of tool constructs and the subtests included in the tool. The Delphi panel did not reach consensus on the inclusion of spelling tasks in the tool. Two participants maintained that the spelling tasks were not relevant for speech–language therapists but for teachers. There was consensus that rhyming skills should be included in the tool and that this skill is relevant in relation to language-based learning disabilities. However, there was no consensus on the nature of tasks to include or the appropriate method to assess rhyming is isiZulu. Rhyme detection or production had to follow isiZulu language patterns and there was inadequate information at the time to guide the selection of items.

The modified final draft of the working memory subtest was discussed by the Delphi panel as it did not form part of the tool trial. The final draft combined digits, words, colours and letters. It required not just sequential naming of the items but demanded keeping the items in memory, immediate and delayed recall of items, as well as, working out solutions from the sequence. The Table 6.4 contains examples of items from the working memory from the tool:

Table 6. 4 Revised Working Memory Subtest

MEMORY CONSTRUCT	ANALYSIS	TEST ITEM EXAMPLE
IDENTIFYING COLOURS	Was the learner able to recall the colour immediately? Yes/ No	1 a. Listen: blue-m-p; What was the colour? A: blue
REPEATING DIGITS	Is the learner able to recall the digits	1b. Listen to the numbers.7-9; What was the

	correctly? Is s/he able to answer the question about the position of digits?	first number? A:7
REPEATING WORDS	Is the learner able to recall all the words in sequence? Able to maintain the task?	1a.Say each word: Umata- Ubaba- Insipho – Imbazo, Hlala - Linda - Khanda- Vula 1b. Now try and say all the words in order:
REPEATING WORDS IN BACKWARDS SEQUENCE	Is the learner able to recall the words in backward sequence?	1a. Imoto- Ukudla A: Ukudla, imoto 1b. Khula- mana A: Mana. Khula

The Delphi Panel reached consensus in the following points about the new working memory subtest:

a. The new subtests achieved the goal of assessing the memory skill and not just vocabulary.
b. The new subtest achieved the goal of achieving working memory not just short term memory.

The use of isiZulu rhymes and stories in the story comprehension tasks was found to highlight culturally valuable information such as relevant lessons. The abstract below is an example of a popular rhyme used by generations of isiZulu primary school learners that was adapted into a story for grade 1 learners in the revised draft of the tool after the trials.

IsiZulu:

> Izinyoni ezinhlanu zazihleli emthini. Yathi eyokuqala “ngibonani laphaya?” Yaphendula eyesibili “indoda enesibhamu!” Yathi eyesithathu “asibalekeni”. Yathi eyesine “asicasheni ngaphansi kwamahlamvu” Yathi eyesihlanu “angimesabi mina! Angimesabi mina!” Saze saqhumi ‘sibhamu “Bham! Bham! Bham!”

English:

> Five little birds were sitting on a tree. The first one asked "what is that?" The second one answered "it's a man with a gun!" The third one said "let's fly away". The fourth one said "let's hide in the leaves". The fifth one laughed and said "I am not scared! I'm not scared!" Until the gun went off! "Bang, Bang, Bang!!"

The use of isiZulu character names was also used to increase familiarity of content and contextualise tasks. This contributed to culturally appropriateness of the tool.

6.9 Therapists Focus Group Discussion

The focus group consisted of four speech therapists and three occupational therapists employed at a remedial school. Participants were English or Afrikaans speakers providing therapy to English second language learners. Each of the three therapists had more than ten (10) years in private practice and in remedial education setting. All therapists had previous experience in government hospitals thereby exposed to other types of developmental language impairments. The discussion of the trial results explored possible reasons for poor performance of learners in different aspects of the language tool. The feedback from the therapists' focus group assisted in improving the error analysis for the tool. The focus group contributions were considered in the review of the final tool draft. The use of the tool as a battery and in conjunction with other relevant assessment was emphasised. The group's observations are tabulated below:

Table 6. 5 Focus Group Discussion Summary

AREAS DISCUSSED	**THERAPISTS COMMENTS**
Learner behaviour	The remedial school learners generally adapted well to testing as compared to learners from other schools. Remedial learners were familiar with testing environments thus they appeared to be less anxious and more cooperative. The effect of the school setting such as classroom lay out, use of the spaces used e.g. Office versus library, may have positively contributed to the learner's attention.
Cultural influences	The therapist and research assistants were all Black African females, which

	may have influenced the acceptability of the testing situation by the learners. They believed the attitude would have been different "if a white person or a male person showed up". The sense of being modern as opposed to sense of being traditional should be posed to parents in the questionnaire. Cultural influences need to be related to level of education, nutrition, parenting style and parent availability.
Speech and language	The learners' years of exposure to English should be accounted for in the testing and the questionnaire. The effect of bilingualism, including losing a first language through subtractive bilingualism, or a process of acculturation should be noted in the analysis of results for each learner.
Performance in Phonological awareness	The grade 3 learners did not outperform other learners despite their age and experience in phonological awareness tasks. Neural pruning could have contributed to scores by grade 3 learners. Confusion due to introduction of spelling rules were cited as possible causes for poor performance for lower grade learners. Children performed badly in some subtests like substitution simply because they don't get taught that way. Therapists thought that teachers don't teach phonics the way speech therapist do and in a format SLTs expect it in their language assessments.
Performance in memory tasks	Learners performed generally poorly in auditory memory tasks perhaps, due to habituation as teachers, parents and therapists tend to repeat information anyway. It may have been a cultural issue that children are not generally required to recall information verbally at home. Poor concentration, poor listening skills, language, cognitive skills were not accounted for in the analysis.
Performance in Math based language activities	Performance in math problem solving and word sums could have been influenced by poor visual perceptual skills. This should be noted in the error analysis. The spatial concepts involved should be developed first before applied in math perhaps the children tested here could have weak or under- developed spatial concepts anyway.

The therapists' focus group deliberated that there was an expectation that the diagnosed (remedial) learners would perform better as they receive extensive training at school in phonological awareness and language processing skills such as auditory memory and word association. Observing the strength in these skills in grade 2 and 3 samples indicate success in

their remedial program and confirm that all the subtests were reliable indicators for L-d LD for this sample. There was a recommendation for further research into the contributors to performance in the tests highlighted above.

6.10 Summary and Conclusion of Phase 2

The five broad learning areas namely, listening, language (expressive and comprehension), memory, reading and spelling and mathematic concepts were found to be universally relevant for L-b LD assessment and for literacy evaluation. The pilot study findings indicated noticeable differences between the parents and the teachers' comments regarding the learner's scholastic abilities. The learners easily understood the images or illustrations used in the tool and were not confused by them. The second phase of the study involved the development and modification of the Bilingual Battery for Language-based Learning Disability. The test battery targeted assessment of five broad learning areas and consists of 15 subtests. The battery evolved through the five trial sessions, in five different locations where it underwent constant modifications. The linguistic and cultural adjustments were reported as well as qualitative analysis of results obtained from each school.

The phase 2 results provide crucial information about the tool structure, its content and administration. The continuous modifications to the tool allowed for improvement in the clarity of instructions, tasks, scoring and analysis. Thus, the results reflect the adequacy of the tool to assess L-b LD indicators. Although the impact of the learning environment, culture and language were considered in each setting, the focus of analysis was the tool and not the learners at this phase. The following chapter 7 will report on the third phase of the study which included quantitative analysis for reliability and validity of the tool.

CHAPTER 7

RESULTS PHASE 3

7.1 Introduction

The third phase of the study explored the validity of instrument using the fifth draft and analysed the test-retest reliability. This chapter starts with a quantitative analysis of the results obtained in 2 schools in the second phase of the study. The purpose of the analysis was to compare the scores achieved by learners who had been diagnosed with L-b LD and those that were in a mainstream school. The L-b LD indicators corresponded with the relevant subtests in the tool and analysed according to the subtests. The unit of analysis were the sum of scores in each subtest. The independent variables were identified to be the grade, gender and school.

Qualitative information was obtained from the frequency distribution analysis of grade, gender and school. For instance the grade learners corresponded with the learner's experience in English. The school corresponded with cultural influences, socio-economic factors and provided information regarding educational factors. Gender was also entered into the model as gender differences have been found in some standardised language tests like the Renfrew Word Finding Vocabulary Scale (Renfrew, 1989) and Peabody Picture Vocabulary Scale (Dunn & Dunn, 1997). Analysis of data for variables having an impact of results was done using univariate analysis of variance.

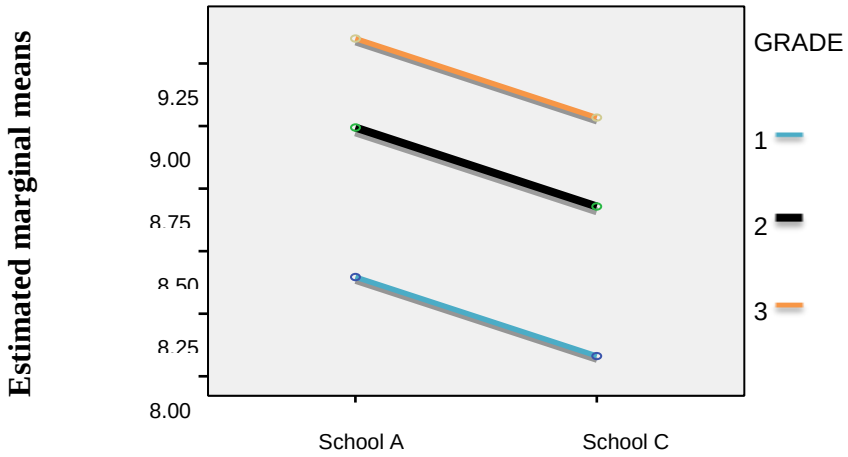
7.2 Comparative Analysis

The results from schools A and C were compared using the General Linear Model. The results from school A, the urban, mainstream school and school C, the urban, remedial school were used for several reasons. Both schools used English as language of learning and

teaching (LoLT), they were located in the same city, and service similar communities. The analysis compared the responses or scores of learners confirmed to have L-b LD in a remedial school C and learners who may or may not have L-b LD in a mainstream, school A. The learners in the mainstream school were treated as possible non L-b LD since their selection was random, identified by teachers as possible L-b LD but there were no formal language or occupational therapy assessments. By contrast, the learners from the remedial school have been diagnosed with some form of L-b LD since they were accepted at the school due to L-b LD and they had history of formal assessments in speech therapy and occupational therapy at the school. This comparison of learners from these schools was regarded as fair on the basis of the similar assessment methods followed using the same draft 4 of the tool.

7.2.1 Comparative Analysis Following Directions

The *following directions* subtests (FE and FZ) which assess listening skills in English and in isiZulu demonstrated interesting patterns. The results indicate that the means for school A was lower in the FZ scores. The results may be explained by two possible reasons. Firstly, the link between weaker language skills and language-based learning disabilities; Secondly the likelihood of higher prevalence of English second language learners with poor proficiency in the language of learning and teaching (LoLT) referred for remedial education. Figure 7.1 displays the profile plots for the English version of the *following directions* subtest (FE) and shows that school A achieved higher means in this subtest



*r Squared= 0.58

Figure 7. 1 Profile Plots Following Directions in English

The profile plots demonstrate gradation in terms of level of complexity of the subtests FE and FZ. The analysis shows overall significant difference between the schools A and C on the selected FZ subtests (p= .048). Additionally, there was no significant difference between the grades (p= .416) in each school and between school-grade correlations for FZ. *r squared=0.39.

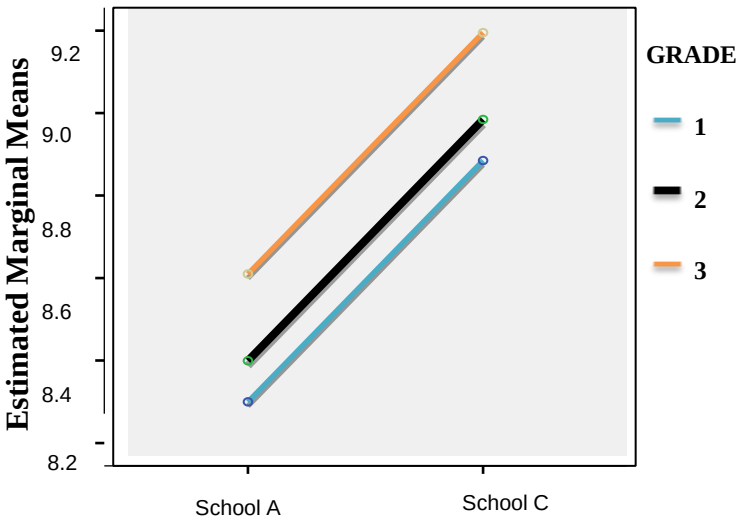
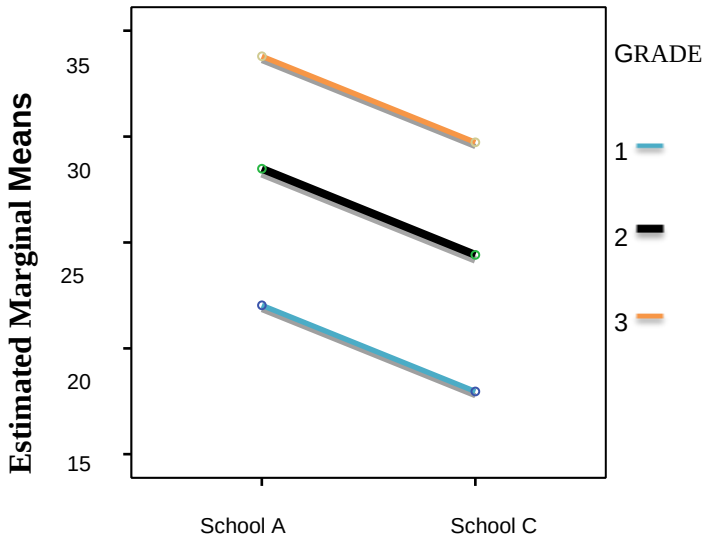


Figure 7. 2 Profile Plots Following Directions in isiZulu (FZ)

Figure 7.2 shows that the means for school C were higher in FZ than in FE. It also shows that for both schools, the higher the grade of the learners, the better the performance.

7.2.2 Comparative Analysis Expressive and Receptive Language Subtests

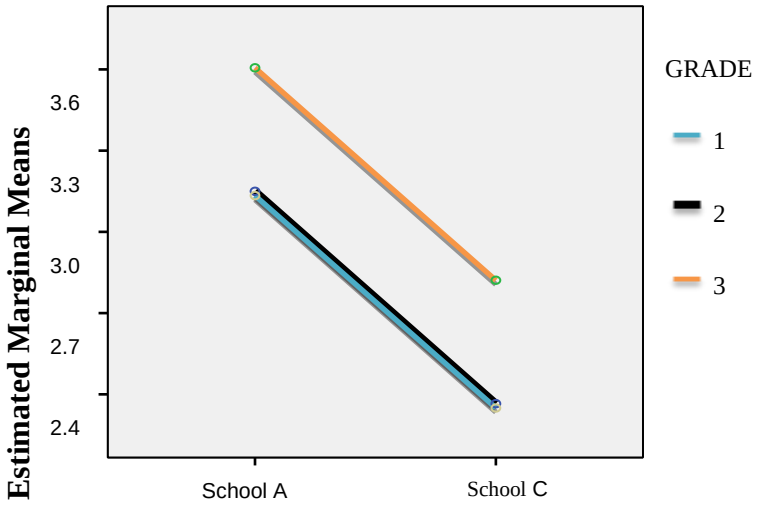
The expressive language subtests, *story comprehension* (SZ) and *word association* (WA) subtests were analysed. The general and custom designs of the general linear model indicated significant difference between the schools (p= .001), the grades (p= .000) and the school-grade comparisons (p= .024). The learners in the mainstream school A performed much better in both subtests. The grade 3 performance was higher in both tests for both schools.



*r Squared=.127 (adjusted R squared=.081)

Figure 7. 3 Profile Plots Story Comprehension Comparison

Figures 7.3 and 7.4 shows evidence of progression in both subtests. However, figure 7.4 shows that for the word association subtests the grade 1 and 2's performance was close. *Word association* could have been a generally difficult test for grade 1 and 2 learners.

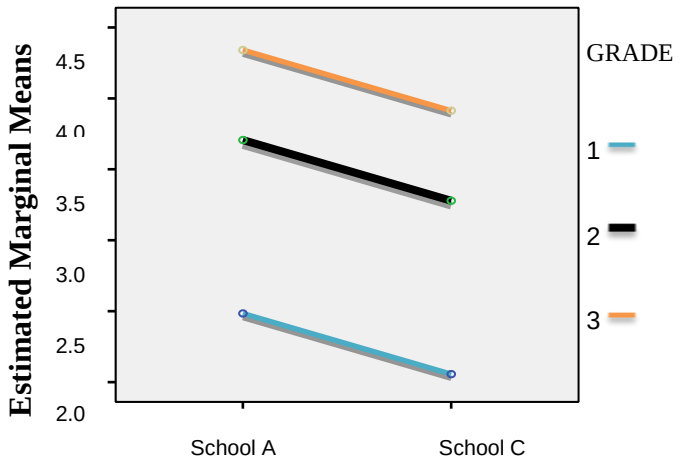


*r squared=.342 (Adjusted R squared=.307)

Figure 7. 4 Profile Plots Word Association Subtest

7.2.3 Comparative Quantitative Analysis Reading and Phonological Awareness Subtests

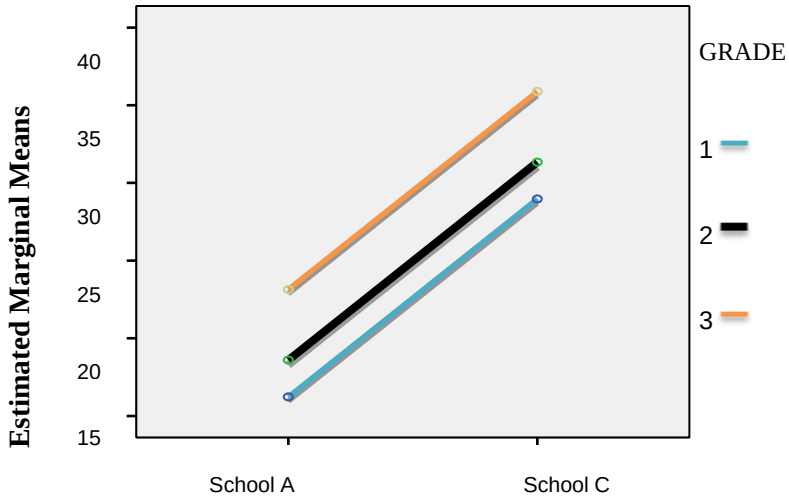
The quantitative analysis results show significant differences in all aspects for reading and phonological awareness subtests. There were differences between school, the grades and between intercept, schools, grades and school-grade correlations (P= .000). Notably, the means for the mainstream school A were higher than the remedial school C in the reading subtests for all grades while, the remedial school C achieved higher means in all aspects of the phonological awareness subtest.



*r squared= .125 (Adjusted R squared= 0.79)

Figure 7. 5 Profile Plots Reading Test Comparisons

The results reflect that reading scores for grade 1 are generally much lower than grades 2 and 3. Additionally, the mainstream scores were significantly higher than the ones for school C.



* *r* squared= .725 (Adjusted R squared =.710)

Figure 7.6 Profile Plots Phonological Awareness Tests

The results for *phonological awareness* skills *and reading* subtest reflect disparate patterns for these related skills.

7.7.4 Quantitative Analysis of Working Memory and Numeracy among Diagnosed and Undiagnosed Learners

The findings for all the working memory subtests and all the numeracy subtests presented with comparable patterns. The mainstream school consistently achieved superior performance. Both the general and custom models indicated significant differences in schools, grades and school-grade correlations. The following table summarises the comparisons of learners by school and grade in the working memory subtests. The table indicates that there was a significant difference in the intercept if the scores for school+ grade+ school & grade; as well as between the schools A and C, and between the grades 1, 2 and 3.

Table 7. 1 School A and C Multivariate Tests for Working Memory Subtests

Source	EFFECT	Value	F	Hypothesis df	Significance
Intercept	Pillai's Trace	.775	49.962	4	.000
	Wilk's Lamda	.225	49.962	4	.000
	Hotelling's Trace	3.446	49.962	4	.000
	Roy's Largest Root	3.446	49.962	4	.000
School	Pillai's Trace	.386	9.123	4	.000
	Wilk's Lamda	.614	9.123	4	.000
	Hotelling's Trace	.629	9.123	4	.000
	Roy's Largest Root	.629	9.123	4	.000
Grade	Pillai's Trace	.373	3.384	8	.002
	Wilk's Lamda	.657	3.384	8	.002
	Hotelling's Trace	.475	3.382	8	.002
	Roy's Largest Root	.337	4.965	4	.002

Table 7.2 summarises the differences in test performance between 2 schools and the findings reflect significant differences in their performance in the numeracy subtests (NV, MPS, and NW).

Table 7. 2 School A and C Multivariate Tests for Numeracy Subtest

Source	EFFECT	Value	F	Hypothesis df	Significance
Intercept	Pillai's Trace	.946	404.151	4	.000
	Wilk's Lamda	.054	404.151	4	.000
	Hotelling's Trace	17.572	404.151	4	.000
	Roy's Largest Root	17.572	404.151	4	.000
School	Pillai's Trace	.140	3.750	4	.007
	Wilk's Lamda	.860	3.750	4	.007
	Hotelling's Trace	.163	3.750	4	.007
	Roy's Largest Root	.163	3.750	4	.007
Grade	Pillai's Trace	.476	7.266	8	.000
	Wilk's Lamda	.539	8.330	8	.000
	Hotelling's Trace	.827	9.412	8	.000
	Roy's Largest Root	.792	18.412	4	.000

The results indicated that for almost all the numeracy subtests, there was a significant difference between the schools A and C and between the grades 1, 2, 3 in each school. Therefore, the tool was found to be specific as it adequately pointed out test by test differences between diagnosed and undiagnosed learners in the school comparisons. Furthermore, the tool indicated grade by grade differences within each school which highlights significant differences in grading of the subtests of the tool.

7.3 Tool Reliability

Three types of assessments were conducted to test internal and external consistency. These are discussed below:

7.3.1 Internal Consistency

The Cronbach's Alpha coefficient was used to measure internal consistency of each subtest since it is the most common measure of reliability to determine if the scale is reliable. The theoretical values of the alpha varies from 0 to 1 and the higher *p* values (≤ 0.70) being desirable. The majority of the subtests presented high Cronbach's alpha coefficients with only four subtests obtaining moderate *p* values ($p \geq 0.6$). Table 7.3 below indicates the alpha values of all the subtests in the tool.

Table 7. 3 Internal Consistency of the BBL-BLD

Subtest Description	**Cronbach's alpha. (*N*=17)**
Following Directions English	0.889
Following Direction IsiZulu	0.803
Story Comprehension Grade 1	0.75
Story Comprehension Grade 2	0.75
Story Comprehension grade 3	0.68
Word Association	0.917
Phonological Awareness Segmentation	0.795
Phonological Awareness Isolation (Initial)	0.817
Phonological Awareness Isolation (Final)	0.814
Phonological Awareness substitution (Initial and Final)	0.81
Phonological Awareness substitution (Medial)	0.81
Phonological Awareness Deletion	0.81
Phonological Awareness Blending	0.80
Reading and doing grade 1	0.819
Reading and doing grade 2	0.912
Reading and doing grade 3	0.927
Reading skills (RAN)	0.933
Repeating digits	0.71
Repeating letters	0.611
Repeating words	0.67
Repeating backwards	0.76
Numerical vocabulary	0,64
Numerical problem solving	0.86
Numerical concepts	0.83
Word Sums	0.900

The principal component analysis was measured as a way of identifying patterns in data as well as to highlight the similarities and differences. Item by item analysis indicated that all

the items contributed valuable information to the tool. However, one item in most subtest would carry Eigen value greater than 3. The most efficient subtest in phonological awareness was found to be the *substitution* subtest. The *numerical vocabulary* was the most efficient subtest in the numeracy section as 5 of the 10 items had significant Eigen values exceeding 1. The *repeating digits* subtest was the most efficient in the sequential memory section as 3 of the 6 items had significant Eigen values.

7.3.2 Test-retest Reliability

Test-retest reliability was calculated for a subsample of 17 participants using intra-class coefficient correlation on SPSS 26. The findings indicate that for the majority of the subtests, the agreement between the first and the second trial was less than 0.5. The following Table 7.4 provides a summary of correlations and levels of significance.

Table 7. 4 Test- Retest Reliability Analysis Using Intra-class Correlation

Subtest	Intra-class correlation	95% Confidence Interval		F Test	
	Average measures	Lower	Upper Bound	Value	df 1
A2 Following directions	.594c	-.074	.851	2.508	16
B1 Story comprehension	.442c	-.447	.793	1.828	16
B2 Word Classes	.044c	-.368	.479	1.102	16
C1 A Segmentation	.035c	-.308	.441	1.092	16
C1 B Isolation (I)	.098c	-1.430	.670	1.110	16
C1 C Isolation (F)	.314c	-.297	.702	1.877	16
C1 d. Substitution (I & F)	.675c	.157	.879	3.332	16
C1 e. Substitution (M)	.854c	-.027	.963	16.097	16
C1 f. Deletion	.470c	-.390	.804	1.917	16
C1 g. Blending	.318c	-1.022	.759	1.441	16
C2 Sound awareness	.380c	-.284	.745	2.039	16
C3 RAN	.009c	-.170	.304	1.038	16
C4 Reading and doing	.036c	-.663	.553	1.057	16

D1 Working Memory (Rn)	-.358[c]	-2.387	.488	.718	16
D2 Working Memory (RL)	.581[c]	-.068	.844	2.521	16
D3 Working Memory (RW)	.214[c]	-1.044	.709	1.282	16
D4 Working Memory (BN)	.327[c]	-.291	.711	1.938	16
E1 Numerical Vocabulary	-.066[c]	-.292	.288	.776	16
E2 Numerical problem solving	.134[c]	-.364	.569	1.308	16
E3 Numerical words	.842[c]	.576	.942	6.723	16

An average measure of 0.7 or above would indicate a good agreement in such as for the substitution (F) and E3 Numerical words subtests. The findings therefore indicate that overall the tool did not achieve satisfactory consistency and reliability. The 95% confidence interval provides with a range of possible results in the sample and in most cases the agreement could reach average agreements between the first and the second trials. The results suggests that some adjustments need to be implemented in the tool.

7.3.3 Inter-rater Reliability

Inter-tester reliability measures agreement of two raters. The statistical method that was used in this study was the Cohen's Kappa (k), a measure of inter-rater agreement for categorical scales where there are more than 2 raters. The results obtained in the phase 3 of the study involved the repeated assessment of 17 learners (n=17). There was a high agreement between the raters on all subtests analysed as the Kappa ranged between .709 and .748 for all subtests. Using the $p < .05$. The results are in favour of the hypothesis (H3) which states that there is no statistically significant difference between the results obtained by tester A and tester B.

7.4 Validation of the Tool

The final phase sought to determine if testing using the BBL-BLD produced precise and specific results. This objective was achieved through determination of an agreement between

the assumed ground truth (teacher questionnaires) and the test scores obtained on trials with the fifth draft of the tool on 20 new participants. The teacher questionnaire was piloted during the trial phase and reviewed by the Delphi panel and a statistician. The reviewed and improved final questionnare comprised of 40 questions which were aligned with the fifteen subtests of the BBL-BLB. The five key L-b LD indicators areas were used to categorise the questionnare and align it to the profile analysis which is the outcome of the tool in order to determine specific weaknesses of learners with L-b LD.

The revised questionnaire was completed by teachers of 20 learners who were identified as having Lb-LD and were available for an assessment. The results indicated varying degrees of agreement between the tool and the questionnare for each subtest. The findings mostly indicate that the tool minimises the False Negative rate thus it hardly misses the correct diagnoses of learners who were identified to have difficulties with LB-Ld indicators.

The following Table 7.5 indicates that there was a strong agreement between the teacher questionnare and the tool on the following subtests: *following directions* in English, *following directions in isiZulu, RAN, phonological awareness blending and isolation for medial sounds, word classes and the story comprehension*. Although the correlation was inadequate for other subtests, there was evidence of good precision for the *word sums, read and do, word classes and phonological awareness- isolation of initial sound and segmentation* subtests. There were good specificity proportions between the tool and the questionnare on the numeracy problem solving subtest.

Table 7. 5 Tool Validity Results:

Subtest	No problem -Q=0 vs. -T=0	Problem found +Q=1 vs. +T=1	Chi Square Value	Asymptotic significance (2-sided) <0.05	Spearman's correlation	Approximate Significance	Comment
A1. Following directions English	11:1	1:7	12.535	.000*	.792	.000	Good Corr.
A2. Following directions isiZulu	10:1	2:7	9.731	.002*	.698	.001	Good Corr.
B1. Story comprehension	10:2	3:5	4.432	.035*	.471	.036	Good Corr.
B2. Word Classes	6:1	5:8	4.105	.043*	.453	.045	Adequate proportion for precision. Good Corr.
C1. PA segmentation	4:0	13:3	.882	.348	.078	.374	
C1b. PA Isolation (I)	4:0	9:7	2.692	.101	.367	.112	Adequate proportion for precision
C1c. PA Isolation (M)	4:0	2:14	11.083	.001*	.764	.000	Good corr.
C1 d. PA Substitution (I & F)	2:2	2:14	2.812	.094	.375	.103	
C1 e. PA Substitution (M)	1:3	2:14	.392	.531	.140	.556	
C1 f. PA Deletion	0:4	1:15	.263	.608	-.115	.630	
C1 g. PA Blending	4:4	16:16	Constant	Constant	Constant	Constant	Excellent corr.
C2 Sound awareness	1:0	6:13	1.955	1.62	.313	.180	
C3 RAN	1:1	0:18	9.474	.002*	.688	.001	Good proportion for specificity, Good Corr.
C4 Reading & doing	1:1	7:11	.093	.761	.068	.776	Adequate proportion for precision

D1 Working Memory 1 (colours)	6:1	6:7	2.967	.085	.385	.094	Good proportion for precision
D2. Working memory 2 (STM)	6:1	10:3	.220	.639	.105	.660	
D3. Working memory 3	6:1	0:13	1.955	.162	.313	.180	
E1. Numerical Vocabulary	10:1	6:3	1.818	.178	.302	.196	
E2. Numerical problem solving	4:5	3:8	.642	.423	.179	.450	Good proportion for specificity
E3. Number words	5:3	6:6	.303	.582	.123	.605	Good proportion for precision

*P=0.05; Q = Teacher questionnare response and T= Tool response based on ROC baseline scores

7.5 Summary and Conclusion Phase 3

The comparative quantitative analysis of phase 2 results are provided at the beginning of this chapter. The results obtained in each school using the BBL-BLD cannot all be matched or compared as different drafts were used in schools. However, the results from the schools that could be matched, reported here, reveal different patterns of strengths or weakness when the two schools are observed. This difference highlights that L-b LD and non L-b LD learners perform differently on the BBL-BLD. This can be viewed as a qualitative sign of sensitivity of the tool observed. The results also indicated differences in scores when tests were administered English and isiZulu. There were significant differences in performances of the same skill in different languages. Using statistical analysis, the BBL-BLD was found to have adequate internal reliability. The findings form two separate testing sessions with the tool indicated good inter-rater reliability and test-retest reliability. The correlation analysis of the tool and the questionnare indicated that the tool has a good False Negative rate. There was adequate validity in most subtests. Correlation of the tool and the questionnare was not good for some subtest however, evidence of specificity and precision of some subtests were seen.

CHAPTER 8

DISCUSSION

8.1 Introduction

The first two objectives of the study were achieved in phase 1. These were firstly, to identify the components of existing tools that could be culturally appropriate for use with isiZulu-English speaking learners in grades 1, 2 and 3, and secondly, to identify early indicators of L-b LD and evaluate their relevance and application to isiZulu-English speaking learners. The findings outlined in chapter 5 highlight the relevant L-b LD indicators and the challenges faced when a language tool is not designed specifically for an intended group of learners and for multilingual South African learners. The recommendations from the pretesting phase were applied to the tool development phase 2 and influenced the design of the BBL-BLD. The findings reported in chapter 6 demonstrate that the process of tool development needs to intensively consider contextual, linguistic and cultural factors that contribute to the identification of the key indicators of L-b LD. This is supported by Juan and Visser (2017) who found that both home and school environments, including school buildings and language of learning, have an impact on the learners' academic achievement (Juan & Visser, 2017). The objective of the study to develop a linguistically and culturally appropriate test for isiZulu-English speaking learners in grades 1 to 3 was achieved in phase 2 through participants' consultations and trials in five schools. The therapists' focus group was satisfied that the tool's content was appropriate.

The Bilingual Battery for Language-based Learning Disabilities (BBL-BLD), was constructed based on the literature review on early indicators of language-based learning disabilities (L-b LD). The five broad learning areas namely, listening, language (speaking and comprehension), reading, written language and mathematics, were identified as universally relevant for assessment of L-b LD and for development of literacy. The results from the pretesting phase, phase 1 of this research, identified extrinsic factors that had a significant impact on language evaluation for isiZulu-English speaking primary school learners. These factors were the school environment, the language of learning and teaching (LoLT),

individual learners' contextual factors including exposure to other languages and to language formal assessment.

The pilot study indicated that assessment of some skills such as rhyming and working memory needed to be explored further in the tool development phase. Hence, the trial phase adopted a quasi-experimental design and continuously modified the tool after each trial location. The researcher heeded the warning from Bedore and Peña (2008) regarding language that even when universal indicators seem to emerge from cross-linguistic literature these are not necessarily based on normative data (Bedore & Pena, 2008). The findings from the phase 2 trials identified unexpected patterns regarding the constructs tested and the L-b LD indicators involved. The third phase of the study sought to evaluate consistency of the developed tool and the validity of its findings. The results from all three phases were presented in chapters 5-7, will be integrated and discussed in this chapter.

8.2 Development of the language assessment tool

The language tool development began with the design of the blueprint based on literature review and the pre-study with existing tools. The tool was refined through a cyclical process of development and modification as supported by developers of large scale assessment tools (Kunnan & Grabowski, 2013, p. 309). Tool development was initiated with constructs that were matched to eight underlying broad cognitive abilities for learning in the adopted theoretical framework based on the Cartel-Horn-Carroll model (Alfonso, Flanagan, & Radwan, 2005). This allowed selection of learning and language abilities that reflected L-b LD indicators. The outcome of phases 1 and 2 of this project was fifteen subtests which relate to the eight broad cognitive language abilities constituting the Bilingual Battery for Language-based Learning Disabilities. The established link between broad abilities, narrow abilities and subtests is demonstrated in Figure 8.1 below.

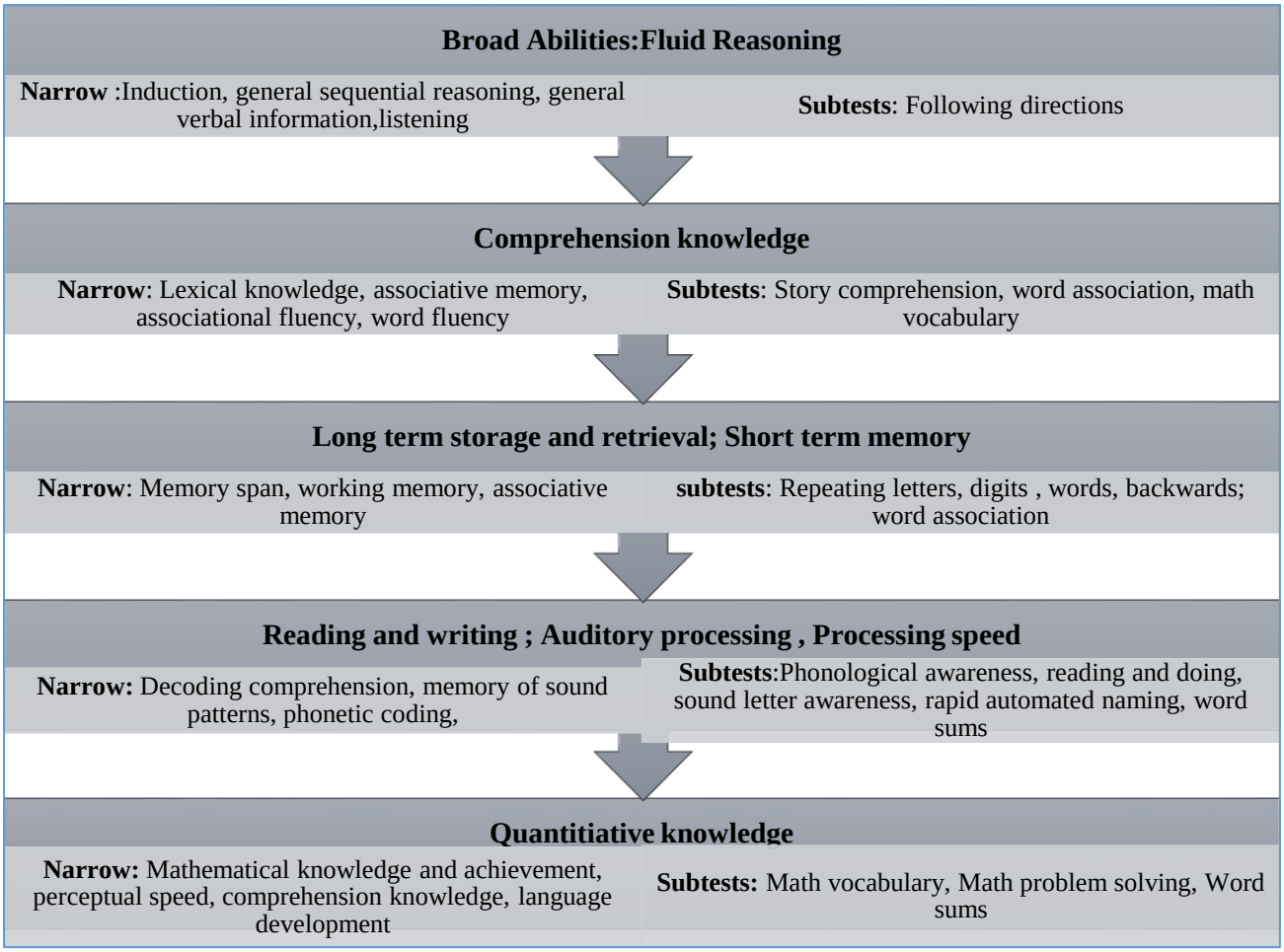


Figure 8. 1 Broad, Narrow and Subtest Link for the BBL-BLD

The Figure 8.1 illustrates how each of the broad cognitive abilities were linked to subtests in the BBL-BLD. The use of a framework that incorporates cognitive processing which affects reading and spelling development in a reciprocal manner is supported in literature (De Sousa, Greenop, & Fry, 2010, p. 165). Cognitive processes that are relevant for L-b LD such as: word recognition, orthographic, semantic, metacognitive and working memory measures; were found to have contributed to better understanding of learners' abilities in this research as previously established in the literature review (Swanson & Alexander, 1997). Furthermore, in relation to English second language learners, it was beneficial to use related cognitive systems as the basis for determining bilateral or primary language impairment (Paradis, Schneider, & Duncan, 2013).

The Cattell-Horn-Carroll (CHC) theoretical framework used in this tool supports many standardised tests for language and intellectual assessment. Tests that share similar goals as the BBL-BLD include the Kaufman Assessment Battery for Children II (Kaufman &

Kaufman, 2014). The KABC is a cognitive test that include measures of acquired knowledge, fluid reasoning, and short-term memory and crystalized abilities which enable assessment of learners with learning disability, attention deficit hyperactivity disorder (ADHD) and cognitive impairment (Kaufman & Kaufman, 2014). The use of the CHC theory as part of the framework of the tool assisted in error analysis and interpretation of the results.

8.3 Parent and Teacher Questionnaires

The second outcome of the study was the teacher questionnare. The teacher questionnare was initially designed to be completed by both the parents and teachers. The results from the pilot study revealed that there were differences between the parents and the teacher's comments regarding the learners' scholastic abilities. Most parents indicated that there were mild or no problems in their children's language abilities. The pilot study also indicated that parents deferred questions relating to academic skills to teachers, some parents stated that teachers were in a better position to offer reliable responses for the questions relating to L-b LD. The current study did not explore the reasons for the parents' deference of opinion on their children's academic performance. However, Mncube (2009) found that the assumed lack of involvement of parents in school activities was related to their level of education or literacy as well as lack of instruction about their participation in school related activities (Mncube, 2009, p. 83). Parsot (2012) cited lack of knowledge on how to be involved in school as one of the reasons for the apparent lack of parent connection (Parsot, 2012, p. 64). Other reasons that were found to be contributory to lack of participation by African parents of children in English medium schools are fear of victimisation of their children by teachers, the parent's language barrier, as well as, difficulty in attending school meetings (Mncube, 2009, p. 83).

Available research implies that African (Black) parents are generally inadequately involved in school related activities such that they feel disempowered to comment about language competencies. The parents' view about their children's language abilities in this study may have been influenced by many factors which warrants an in depth study on the matter. The findings regarding parents and teacher questionnaires in this study highlight the significance of systems thinking regarding learners with L-b LD as discussed in the literature review chapter. This study's finding is none the less significant and challenges the analysis of concordance rates between the parent and teacher observational ratings, highlighted in the literature review, with the CELF-4 which found that parents may be in a better position than

teachers to distinguish culturally accepted behaviour and linguistic variations in dialects than the teachers (Massa, Gomes, Tartter, Wolfson, & Halperin, 2008). Evaluation of the concordance rates between the teachers' academic and parents' socio-cultural questionnaires should provide comprehensive information and clarify whether or not parents are in denial about the learner's learning difficulties.

The final teacher questionnare focused on expressive language, comprehension skills, reading, writing and numeracy skills. The 40 questions in the revised questionnaire were aligned with the final draft of the tool. Its mapping was verified in the third phase of the study. The teachers were regarded as reliable and consistent since they used standard procedures to evaluate their learners, which are likely to be more structured and fair. Although teachers were considered experienced in issues regarding literacy, the parents' role in diagnostic language assessment cannot be ignored as they provide the language history which helps in distinguishing between language impairment and language differences among bilingual speakers (Stow & Pert, 2015, p. 8). Teachers and parents' views are both limited when isolated as they see a child in different linguistic and cultural contexts. This is especially important because teachers' beliefs are often influenced by their own background and culture (Shaik, 2016, p. 1). Thus, when developing resources for practice in education, it would be limited if they do not take into account teachers' content and pedagogic knowledge of subjects (Bose & Seetso, 2016).

8.4 Language of Testing

The results and observations from the study highlighted the complexity of language issues in KZN primary schools. The choice of LoLT by the schools and the language priorities for the learners were at times difficult to define which corresponded to the findings in the literature review chapter regarding complexities of multilingualism in South Africa (Moodley, Kritzinger, & Vinck, 2016). The majority of the learners assessed in the trials could be considered bilingual with English as their second language. The definition of bilingual in this study was informed by three facts. Firstly, all learners learnt more than one language as a subject at school; secondly, most learners used English as LoLT despite being first language isiZulu speakers (four of the five schools elected English as LoLT); thirdly, learners did not separate the use of language between home and school. In most cases learners continued to use a combination of languages in their home environments which is contrary to Grosjean's

beliefs about bilingual learners using different languages in different domains (Grosjean, 2009, p. 4). However, since the study did not focus on the nature of the learner's bilingualism, the findings did not fully explore the language demands in the home environment and the levels of competency between L1 and L2. Furthermore, there is an additional contribution of the media to language use in the homes. According to the Media Monitoring Africa's 2012 report, SABC 1 channel is dedicated to isiZulu, isiXhosa, seSwati and isiNdebele programmes and the most likely choice for isiZulu speaking homes (Dibetso & Smith, 2012, p. 12). However, at least 76% of programming in SABC 1 channels are in English and 5% in isiZulu (Dibetso & Smith, 2012, p. 12). Therefore, the likelihood of exposure to both English and isiZulu at home is high.

The tool trial and modification process revealed the need to assess learners in both English and their home language to obtain a complete view of their abilities as also supported in literature (Cummins, 2008; Koch, 2007) The quantitative results in chapter 7 indicated significant differences in the comparisons of English and isiZulu subtests. The findings are in agreement with the recommendations in the literature review for speech and language professionals to understand and always draw on the knowledge and use of the home language when assessing learners who are multilingual (Mdlalo, Flack, & Joubert, 2016). Section A of the BBL-BLD focused on bilingual listening skills whilst section B evaluated bilingual receptive and expressive language skills. Achievement in the three bilingual subtests in these sections, the *following directions* in English and isiZulu, *word association* in English and isiZulu and *story comprehension* in English and isiZulu, provided valuable information for comparing the learners' expressive language abilities and comprehension knowledge in both isiZulu and English.

The results in chapter 5 revealed that for reading skills, the learners performed better in English than in their first language isiZulu. The possible reason for the findings is that the grade 1, 2 and 3 learners tested have acquired the reading skill initially in English and have not been provided with the opportunity to read text in isiZulu unless it is officially introduced at school. Similar results were obtained by Van Staden, Bosker and Bergbauer (2016) who compared reading achievement when learners use a home language and when they use English, their LoLT. Their results showed a discrepancy between the language of testing and the home language and the performance scores decreased substantially in the home language. Van Staden *et al*. (2015) concluded that African children are disadvantaged when a strong

base for their home language has not been developed (Van Staden, Bosker, & Bergbauer, 2015, p. 8).

A number of South African studies have found ESL learners to have poor reading skills compared to monolingual English or Afrikaans speaking learners (Broom, 2004; Le Roux, Geertsema, Jordaan, & Prinsloo, 2017). The findings in this study indicate that even though isiZulu-English speaking learners may have below average reading skills, their performance in English was still better than in their home language. This study corresponds with the conclusion by Van Staden et al. (2016) that testing in an African language may provide significantly lower results compared to English. The learners in this study also preferred English as the language of testing in numeracy tasks even though the option to test in isiZulu was provided for them. This finding demonstrates that learners preferred the language in which they have acquired the skill when they are evaluated. The findings from this study support the notions regarding the linguistic system discussed in the literature review and suggests that language assessment for L-b LD should be in both the first language, isiZulu and the additional language or LoLT. This leads to differentiation between language impairment and normal bilingual language development as hypothesised in Hakansson, Salameh, & Nettelbladt (2003).

8.5 Qualitative evaluation of the developed tool

The design, constructs, content and administration of the BBL-BLD are evaluated below in reference language assessment approach discussed in section 2.9 of chapter two and to the standards set from the universal principles of test development in chapter 4.

8.5.1 Inclusive Assessment Population

The BBL-BLD was developed through the participation of learners from different sub cultures, various dialects of the isiZulu language and varying socio-economic strata. The tool addressed fairness by allowing learners to be also tested in their home language. Bilingual assessment tasks and the inclusion of numeracy-based concepts proved to be a necessary for a holistic language assessment. The significance of "*whole to part"* approach facilitates addressing language and literacy simultaneously (Clendon & Erickson, 2009, p. 76).

Providing items in isiZulu was challenging in terms of maintaining the cognitive complexity of the tasks. Solarsh and Alant (2006) found that participant consultation, adherence to

translation protocols and an in-depth insight into multi-cultural testing contribute to cross-cultural test development. As the principal researcher, I looked out for gender and age bias in test items. The bias of raters and ratings were avoided by using raters who are also isiZulu speakers and familiar with the testing environments. The significance of participant consultation was also emphasised by Holding *et al.* (2010) and Mdlalo (2015). The learners, parents, teachers and therapist were participants in the tool development process in this study.

8.5.3 Amendable to Accommodations

Accommodations such as extension of testing time and testing over multiple sessions were applied to accommodate learners with possible ADHD. The BBL-BLD analysed the learners' results individually based on their school environment, cultural and linguistic context and only compared to peers in the exact same setting.

8.5.4 Accessible, Non-biased Items

To observe for bias, as the principal researcher, I did not personally assess the learners but observed and assisted in the testing process. I ensured that the procedures were uniform in all schools so that decision making is equitable for all (Kunnan, 2014, p. 8). The use of cartoon pictures was inspired by the Kaufman Assessment Battery for Children (K-ABC 2nd Ed. 2, 2004) (Kaufman & Kaufman, 2004). The criticism of the images of the BBL-BLD by some members of the Delphi review panel were that pictures such as the "reading cow" and "cow with wings" were unreal and required higher cognitive functioning. Yet, the phase 2 results indicated that all learners in the study understood the images and were not confused by them. Similar challenges were faced by the first issue of the K-ABC as it contains unreal images of fish, plants and shells (Kaufman & Kaufman, 2014). Its review reflected that the use of colourful and true to life images were helpful in maintaining rapport with young children. The KABC-2 was adapted in Uganda and found the test to be culturally fair and sensitive to socio-economic indicators despite the test pictures being unfamiliar (Bangirana, et al., 2009). The K-ABC II was translated and piloted in rural isiZulu speaking communities without minimal changes to the illustrations (Mitchell, 2015). Therefore, this study established that imaginative illustrations were acceptable for school age isiZulu-English speaking learners in both urban and rural learners. Mdlalo (2015) found that urban and rural children's perception of pictures were similar except that rural children were more conscious of racial differences in pictures. As much as the BBL-BLD used cartoon pictures they were linked to real life images which made it easy for learners to recognise.

8.5.5 Precisely Defined Constructs

Test constructs in this study were clearly defined using the intrinsic early indicators of L-b LD as per Figure 2.3 in chapter 2. The selected constructs were redefined in a manner that is easily understood using the local English dialect as can be seen in Appendix A. The names of the sub-test reflected the specific construct under evaluation. Consequently, the use of terms such as *following directions, story comprehension, word association, reading and doing* allowed for precision and clarity of terms and constructs used. These constructs required different cognitive levels as recommended in Bloom's taxonomy to tap on knowledge, comprehension, application, analysis, synthesis and evaluation of skills (Althouse, 2017). Cohen and Wollack (2015) support the assessment of the construct of interest not the context.

8.5.6 Simplicity, Clarity and Comprehensibility

The BBL-BLD used plain language that is concise to convey meaning. Simplicity was assured in the choice of vocabulary, examples and trial items such that it was appropriate for each age group and also easily understood by the tester regardless of their first language. The subtests scores did not accumulate into a standardized scale but yielded a profile that indicates areas of strength and weaknesses. Dockrell and Marshal (2015) state that because language is dynamic even minor problems can affect the learner's ability to access the curriculum (Dockrell & Marshal, 2015, p. 117). A criterion referenced approach to interpretation is preferred as it determines the learner's level of mastery rather than in relation to other learners (Kunnan & Grabowski, 2013, p. 307).

The BBL-BLD addressed cultural and linguistic preferences in five locations thereby increasing the tool's sensitivity. A similar method was used by Solarsh and Alant (2006) in the development of the Test of Ability to Explain (TATE ZC) where she showed that repeated piloting or trials with the developed tool facilitates continuous accommodation its users. The vocabulary choices in instructions and test items were constantly modified according the responses the learners provided. An interesting observation from this process was the replacement of some of the proper isiZulu words for items such as animals, numbers, and other household items with English versions. For example, the isiZulu word *indlulamithi* was found to be less familiar than the word *giraffe*. Similarly, English words for numbers replaced isiZulu ones. The final draft of the BBL-BLD proved to be an adequately designed a tool in a manner that is culturally and linguistically inclusive yet comprehensible for different dialect users.

8.5.7 Readability

Monitoring item length, avoiding words with dual meanings and use of high frequency vocabulary were some of the considerations made for readability in the blueprint (Dempster & Reddy, 2007, p. 910). The provision of possible answers and guidelines for analysis in both English and isiZulu contributed to improved readability and understanding of the learners' responses in the BBL-BLD. Mdlalo (2015) supported the creation of appropriate context through use of familiar language phrases, illustrations and vocabulary. The use of familiar nursery rhymes and isiZulu character names, contributed to creation of familiar context in the BBL-BLD.

8.5.8 Maximum Legibility

Two methods were used to inform item legibility in tool development in this study. These were expert review and quantitative analysis. The use of these methods ensured that the illustrations and items were clear and accessible for all learners as well as ensured that assessments adhered to principles of universal design (Johnstone, Altman, Thurlow, & Thompson, 2006, p. 35). In addition, The BBL-BLD test analysis form included possible correct answers and error analysis column for each subtest. The analysis page at the end of the test facilitated integration of results with classroom presentations and parent-teacher reports.The linear scoring system, error analysis and profile reporting allowed for easy integration of information, facilitating a link between the BBL-BLD and other tools e.g. questionnaires. The evaluation of the BBL-BLD by the therapists' focus group indicated that the objectives of the research were achieved in developing culturally and linguistically appropriate tool components.

8.5.9 Tool Weaknesses

Tool weaknesses were found to be in the following areas:

a. The sequential memory and working memory subtests produced inconsistent results despite continuous adjustments to the item pools during the trials. This reflected negatively on the tool's ability to offer useful information regarding memory skills. As a solution, adjustments were made to the final draft of the tool which was developed after the school trials and submitted to the Delphi panel for comments. This draft modified the design of the subtest from an immediate recall tasks to a memory

processing task. It added delayed recall techniques and reduced the number of test items. The working memory subtest needs to be tested thoroughly in further research.

b. The tool tested sequential and working memory using letters and numbers the researcher which may have been testing experience rather than memory ability. In response, the revised working memory subtest incorporated use of letters, numbers and colours. The main alteration was on the nature of the tasks which allowed for keeping items in memory for longer before they were re- presented to the tester.
c. The Delphi team did not reach consensus on the degree of cultural appropriateness of the illustrations used in the tool. Forty percent (40%) of the team felt the illustrations were familiar objects but did not necessarily correspond with isiZulu culture. The feedback from the tool trials suggested that all learners perceived the illustrations to be clear and unambiguous in terms of content. The contradiction between trial results and the Delphi reviews suggests further considerations and adjustment of the illustrations.
d. The numeracy based language subtests did not include all numerical skills required in the foundation phase as it did not include shapes and measurement concepts. Informal assessment of additional numerical concepts is encouraged so that only relevant skills are tested for each learner.
e. The tool took a minimum of 45 minutes to administer. The length of time was found to be too long for some learners and may have implications for administration to learners with attention deficit, hyperactivity or other concomitant physical disabilities. As a solution, the tool may require to be administered in more than one session. This modification has not been proven in research to alter findings of assessments.
f. The size of pictures used and font size in rapid picture naming may be small to accommodate learners with possible poor vision or colour blindness. The pictures and font can be adjusted in terms of size as required by the testers.

8.5.10 Tool Strengths

The following strengths were identified:

a. The BBL-BLD was found to be age, grade, and gender appropriate. Althouse (2017) emphasised that a valid and reliable test should control for bias due to geographic region, ethnicity, gender, age, education level and experience. Learners from 4

regions of KZN participated in the tool trials, making the tool widely applicable to the target population of KZN.

b. The BBL-BLD allowed for a comparative analysis of isiZulu and the English language competencies which is critical for bilingual learners (Dockrell & Marshal, 2015, p. 118). Assessing skills in both languages is critical for literacy as it helps practitioners to understand each learner's true potential.
c. The BBL-BLD considered cultural factors by involving parents, considering language dialects, considering the school and community culture and by evaluating the behaviour of each learner after the assessment. Considering information about culture influences the design of the tool in terms of instructions, vocabulary choices, illustrations and most importantly interpretation of results.
d. The BBL-BLD provided subtests that related to language skills to mathematical concepts. This is relevant for analysis of ESL learners with math difficulties since quantitative knowledge is important for math literacy and application and relevant for assessment of these abilities.
e. The BBL-BLD is a composite test and offers a broad range of information gathering activities as suggested by Dockrell and Marshall (Dockrell & Marshal, 2015, p. 120). Fluid intelligence elements of inductive and sequential reasoning abilities were found to play a moderate role in reading comprehension and math achievement (Flanagan, Alfonso, & Mascolo, 2011, p. 264). Since L-b LD is indicative of difficulties in cognitive processing such an assessment relates to the core skills.
f. The BBL-BLD required use of abilities such as general sequential reasoning, induction involves manipulating rules, abstracting, generalizing and identifying logical relationships. These abilities are important for reading, math and writing difficulties (Alfonso, Flanagan, & Radwan, 2005, p. 474). Use of these methods shows that the cognitive aspects of literacy were evaluated.
g. The BBL-BLD provided examples of possible answers and error analysis. Althouse (2017) emphasises that a valid and reliable test should offer results that enable decisions. The profile analysis form of the BBL-BLD provides the practitioner with direction to determine a plan for intervention.
h. The high agreement between the raters on all subtests analysed led to the acceptance of the third hypothesis that there is no statistically significant difference between the

results obtained by tester A and tester B, in favour of hypothesis H3. The adequacy of interrater agreement indicates that the tool should be used reliably in other contexts.

i. The use of different types of review teams i.e. focus group, Delphi panel and teacher questionnaires, increased content related evidence for validity.
j. The BBL-BLD was found to be consistent as repeated trials with the tool provided similar results. Consistency means that the tool can be used in other settings and further trials which will benefit more learners.
k. The comprehensive nature of the BBL-BLD allowed for the analysis of different aspects of learning which included valuable information on math based concepts and vocabulary, an area that is missing in most available language tests.
l. The BBL-BLD was found to be reliable in detecting some universal indicators of L-b LD for bilingual isiZulu speaking learners. The detection of the early indicators is critical for prevention of severe consequences of language- based learning disorders and poor literacy.
m. The BBL-BLD is inexpensive as it does not require special equipment to administer or score. Scoring the response items can be done faster and less expensively (Cohen & Wollack, 2015).

8.6 Reliability and Validity

The tool trial results indicates that some subtests were reliable as they showed internal and external consistency. For the subtests that did not reach satisfactory reliability levels the possibility of threats to validity are not excluded. There are possible threats to internal validity which include history or events that occurred prior to testing (Cooper & Schindler, 2008, p. 253). Example of threats include, prior exposure to English or pre-schooling, maturation, even changes that occur within the short term period of testing period such as hunger, thirst or tiredness, inattention and the actual process of taking the test. For the remedial school learners, familiarity with test taking and changes to the instrument after each observation were possible threats. However, using the same testers or observers helped to reduce these threats. Other potential factors that could have distorted the results related to the different observers or testers may have been observer boredom, anticipation of results, selection of participants, involvement of teachers and parents' opinion on selection (Cooper & Schindler, 2008, p. 253).

Experimental mortality is a phenomenon that occurs when the composition of the study group changed during the experiment (Ngulube & Ngulube, 2015). The selection of participants was based on consistent inclusion criteria which enhanced the equivalence of the groups to combat this effect. Nonetheless, five very different groups of learner participants took part in this study which may have increased experimental mortality and affected the results. Statistical regression was not applicable because extreme cases were not selected. The use of principal component analysis, Cronbach's alpha and item by item analyses of the tool items contributed positively to consistency and reliability of the tool. However, in general the tool was not found to be reliable in its current state. The main possible negative effect on the reliability measures is the sample size for this part of the analysis. Only 17 participants could be reached for test- retest evaluations which was a small sample. Furthermore, modifications in the design and scoring of the working memory subtests, the rapid automated naming, story comprehension and some phonological awareness subtests would improve the consistency of the tool.

The teacher's questionnare was assumed as the ground truth in the evaluation of validity of the tool in chapter 7. Ground truth is a set of measures known to be more accurate that the measurement of the system one is testing (Cardoso, Pereira, & Ramos, 2014, p. 27). The questionnare was a subjective assessment by the teacher, therefore naturally biased. However, since the teacher had the relevant experience and knowledge regarding the learner's general language abilities, it served the purpose of becoming a predictor variable for the presence or absence of the L-b LD indicators (Cardoso, Pereira, & Ramos, 2014, p. 27). Adopting teachers' instead of parents' responses as the benchmark of the learners' areas of difficulty was recommended in the modification process of tool development. The use of the questionnare as a ground truth is supported as evidence of convergence validity (Sireci, Han, & Wells, 2008, p. 114). The correlation of the findings in different subtests implied an agreement between the tool scores and the predicted responses by the teachers. Some subtests did not report adequate correlations with the teacher questionnare. The questionnaire was likely to be the rationale for the poor correlations since the questionnare was not thoroughly analysed for concordance with the tool.

8.7. Implications for the L-B LD

Five categories of early indicators of L-b LD were found to be relevant in this study. These are listening, expressive and receptive language, reading, written language and math. Although the identified indicators are universally established, the assessment methods and test items were specifically designed for the population in the study. The findings from the trials and validation phases indicated that there were discrepancies in the performance of the learners, regardless of the weaknesses of the tool. Although the results are not entirely indicative of a language profile of isiZulu speaking learners, the findings from the three phases provide a clear pattern of L-b LD difficulties for bilingual learners in grades 1, 2 and 3.

The majority of the leaners performed below average in all subtests, displaying varying difficulties with some constructs more than others. Overall the learners performed better in: *following directions* (isiZulu and English), *story comprehension* (isiZulu), *phonological awareness, reading* (English), *math problem solving* and *number words/ math vocabulary*. The learners consistently performed poorly in *word association (*categorizing words and explaining reasons for the association*), repeating letters, repeating words, repeating backwards, spelling* and *word sums*. In other words, the learners performed poorly in all subtests but worse on subtests related to working memory and application of language skills.

The BBL-BLD used sequential memory and backward naming tasks to reflect of the working memory construct. Short term memory (STM) is a subset of working memory (WM) (Alloway, Gathercole, Adams, & Willis, 2006). In both STM and WM tasks there is use of verbal materials in a serial recall task, that requires perceptual grouping or chunking, phonological coding and speed of rehearsal of phonological information. The tasks used in the memory section were simple short term memory tasks which required immediate recall of digits, letters and bi-syllabic isiZulu words. The tasks in the BBL-BLD were considerate of the possible limitation in the learner's experiences, by using isiZulu words, single digits and colours. The digits and letters were initially considered neutral characters and familiar to all South African school going children despite linguistic and cultural variations (Cockcroft K. , Alloway, Copello, & Milligan, 2015). Since all memory tasks used were carefully selected and adapted from similar tests, the researcher was confident that the tool items were age appropriate, tapped the relevant cognitive processes and allowed for cognitive progression.

However, the majority of the learners failed to achieve even a 50% score in these tasks. It was unclear whether it was familiarity with the recall task or the level of item difficulty that contributed to poor scores.

One of the modifications later made to the memory subtest was the use of letter names instead of phonics in the *repeating letters* subtest. The production of letter names appeared to be more standard across the schools than phonics. The research assistants' reviews reported that the use of phonics introduced confusion between isiZulu and English sounds. The learners appeared to constantly face the dilemma of which pronunciation to use, despite of the version they hear. This supports the findings of De Sousa, Broom and Fry (2011) that despite exposure to English instruction, bilingual learners use their spoken isiZulu phonological structures in their English reading acquisition. The comparison between phonics and alphabet names need to be analysed further in future research.

The learners in this study generally performed poorly in the *repeating numbers* which, is a digit span subtest. Digit repetition requires a person to repeat in the correct order a series of digits presented auditory (Rispens & Baker, 2012, p. 687). Less than 10 % of the participants in this study achieved a minimum score of 50% on this task. Poor performance on the digit span test was also observed in Gambia. Linguistic bias was found to effect digit span test for Wolof speaking learners (Jukes & Grigorenko, 2010, p. 23). Better performance of urban learners from Sub-Saharan Africa in tasks such as digit span was observed due to adaptation and fostering of cognitive skills (Jukes and Grigorenko, 2012, p. 24). Typically developing Afrikaans speaking grade R learners obtained an average score 52% while the score for monolingual English speaking children was 55% (Gagiano & Southwood, 2015, p. 50). Both groups performed much better in sentence repetition tasks achieving an average of 73% in Afrikaans and 86% for English speakers.

In this study the instructions for the digit repetition task was provided in isiZulu but the digits were in English. The current study revealed that by testing sequential and working memory using letters and numbers, the researcher may have also been testing experience in addition to short term memory ability. These results suggest three things: firstly, achievement on the digit span task by South African children is generally below international norms (Cockcroft & Alloway, 2012, p. 289); secondly, semantic coding could have assisted the learners to achieve better scores since items were presented in their own languages but lacked context

usually provided by a sentence. Thirdly, children with language impairment performed significantly below typically developing children in these tasks as discovered in recent research (Gagiano & Southwood, 2015, p. 50). Therefore, differentiation of language impairments is important prior to testing auditory memory.

The use of English items and academic based concepts of letters and numbers was noted to be a limitation for this tool and was revised in the final draft. To improve the tool in the final draft, the addition of isiZulu words on the word recall task aimed to enhance the depth of the memory subtest and increase familiarity of the items. This modification did not have the desired effect on the scores. The researcher assumed that since a multi-trail learning of items in a sequence principally depends on semantic rather than acoustic coding, the use of isiZulu words will provide the necessary semantic coding (Baddely, 2003). On the contrary, the learner's performance on the word recall task was comparable to the digits and phonics repetition tasks. The specific weaknesses identified could have been in storage, verbal processing skills or visuospatial memory. Therefore, it is still difficult to explain why the learners generally struggled with the recall tasks despite of the use of familiar concepts and isiZulu instructions. This study recognises that apart from establishment of local norms, more research is required to explain how isiZulu-English speaking learners can be assessed effectively in working memory. Perhaps the solution is in the incorporation of the stronger visuospatial elements to working memory tasks.

Subsequently, the memory subtest was modified to allow for listening to the sequence, applying it to memory, enable visualisation of the items, keep it active for immediate recall and maintain it in focus when it is recalled again. This method places an emphasises on the provided information which, required an activation of memory representations that are currently active, to either bring them to focus or maintain them in focus or in the case of suppression to dampen them to focus (Engle, Tuholski, Laughlin, & Conway, 1999, p. 312). Accordingly, the learners need to have the semantic understanding of numbers, colours, alphabets or phonics to be able to manipulate them. The impact of multilingualism or the bilingual advantage cannot be disregarded in memory tasks. Memory has implications for learning and remembering both familiar and unfamiliar words (Milligan, 2015, p. 225). It is also critical to note that both tasks rely on controlled attention, for that reason, the nature of participants also determine the degree of covariation in tasks and individual differences should be expected (Engle, Tuholski, Laughlin, & Conway, 1999, p. 312). This study

suggests that a training opportunity must be provided for working memory and phonological awareness tasks. Learners were generally unfamiliar with the tasks and displayed varying experiences with skills requiring processing of verbal information.

Performance on expressive and receptive *word association* and *word sums* were weak despite use of dual language evaluations. The interesting fact about the achievement in these skills is that one needs to have adequate receptive or non-verbal vocabulary in order to process the verbal tasks (Frijters, et al., 2011). As much as the tool compared performance in both languages it did not fully explore the competency of vocabulary in L1 and the integrity of receptive vocabulary in both languages. Additional assessments may require not only the assessment of the learnt skill (association) but on communication ability as well. There is a gap in our understanding of how isiZulu speaking learners actually learn these skills for literacy.

Learners displayed better reading skills in English than isiZulu learners, simultaneously, learners displayed inadequate phonological awareness skills. As reflected earlier, reading is a skill taught formally at school, an environment where English is dominant (Trudell & Schroeder, 2006, p. 5). English and isiZulu languages are characterised by different orthographic depths and are learnt differently which affects phonemic awareness (Trudell & Schroeder, 2006, p. 3). Notably, greater phonemic awareness is required in shallow orthographies, like isiZulu, because of the close connection between symbols and sounds (Trudell & Schroeder, 2006, p. 4). Phonemic awareness relates directly to literacy because phonemes contribute to distinguishing meaning in words (Le Roux, Geertsema, Jordaan, & Prinsloo, 2017, p. 1). Hence, monolingual isiZulu and English speaking readers may use different learning strategies to learn concepts related to phonemic awareness. Phonological awareness skills such as blending, segmentation and discrimination was found to be weak in ESL seSotho speaking learners and depended on the integrity of the two languages involved (Le Roux, Geertsema, Jordaan, & Prinsloo, 2017, p. 8). IsiZulu is similar to seSotho in using simpler phonological structure which contributes to learners being less sensitive to phonemic awareness. Practitioners should not take these minor differences for granted.

The process of learning to read and write is approached differently by bilingual speakers and assessing it should also be carefully planned. The BBL-BLD assessed phonological awareness using pseudo words in order to isolate the construct and reduce linguistic bias. The

vocabulary choices, familiarity of the word or dialect relevance were thereby excluded from the construct tested. However, the use of pseudo words in *RAN* and *phonological awareness* tasks was a challenge for some learners in the current study). Dynamic assessment approach is recommended to be culturally fair with such tasks (Lidz & Pena, 2009, p. 121). Accommodations that are suggested by this study are use of verbal and visual prompts during testing and use of additional trial items for practice.

8.8. Cultural Implications

One of the outcomes of this study was the cultural guidelines for language assessment for bilingual isiZulu-English learners. These guidelines reiterated the importance of using original items and culturally appropriate illustrations for South African learners. The findings revealed that beyond consideration for age, gender and grade level, language assessment for isiZulu-English learners needed to consider additional environmental factors. The school culture, teaching methods, prior exposure to other languages and cultures at home as well as specific length of experience in English were found to be other key elements to consider when designing a tool for L-b LD learners. The observation of the learner within his environments proved to be more extensive than just consideration of school and home contexts. Habituation to the testing environment and use of multiple trial items were found to be key to culturally fair language assessment in this study. When learners are familiar with the demands of the test they relate without anxiety to a stranger in their environment even though they are faced with unfamiliar test materials and procedures (Abubakar, Holding, van Baar, Newton, & van der Vijver, 2008, p. 225). This study implies that familiarity increases sensitivity of the assessment and practitioners should provide an adequate opportunity for learners to establish rapport.

The impact of socio-economic factors should not be undermined. When comparing learners from disadvantaged backgrounds to their British or American counterparts, one can observe that as the African learners may have little general experience with number concepts, shapes, measurements and letters outside of their school environment compared to children that participated in standardised test populations (R. Paul, 2016, Personal Communication, 8 October). Low cost housing in Soweto performed poorly in the literacy tests compared to learners in conventional homes (Pillay, 2017, p. 6). There was a relationship between housing conditions and literacy achievement, possibly due to factors such as involvement of learners

in home duties, lack of exposure to television and educational support from parents (Pillay, 2017, p. 6). Unfortunately the current study did not consider in-depth information about the living conditions of the learners such as housing but it generally supports contemplation on all contextual relevant factors for each learner. More importantly, the involvement of parents in language assessment of learners with L-b LD is of critical importance. Parents would have an insight on acceptable cultural and linguistic variations.

Mdlalo (2015) states that there was no difference between the picture perception of learners in rural versus urban areas but the media exposure assists learners to learn about objects not available in their immediate environment. Most learners who participated in this study reside in townships and rural areas where there are few if any road signs, no written signs for most buildings and few house numbers. Thus these learners were generally not exposed to numbers, colour and letter concepts in their natural environments and only exposed to them at school. This lack of practical application of information may have contributed to poor performance in tasks, which assumes a baseline exposure to literacy. This study highlights the uniqueness of the South African context in that there were numerous cultural, linguistic, economic and educational disparities amongst the participating schools. This study also presents KwaZulu-Natal as an example to demonstrate that educational and socio-economic disparities are consistent in South Africa. Practitioners should recognise that although integration in education occurred over twenty years ago, it has also evolved.

8.9 Implications for the Linguistic System

This study assumes a balance between cognitive, linguistic, educational and social systems for children with language-based learning disability. The Delphi panel and therapists' focus group discussions produced linguistic guidelines for tool development for bilingual isiZulu speakers. The guidelines emphasised comparative assessment in English and isiZulu when testing isiZulu-English speaking learners. The qualitative observations generally indicate that the learners did not fit a strict definition of bilingual speakers. The results from the trial phase (chapter 6) also indicated that the learners were not necessarily stronger in isiZulu than English because the learners' language abilities varied considerably across the schools and across the subtests. They consistently showed strengths and weaknesses in skills assessed in isiZulu and in English. Lloyd, Paintin and Botting (2006) stated that assessing children on the same measures, using different methods should give a more accurate picture of the linguistic

profile (Lloyd, Paintin, & Bottin, 2006, p. 52). Therefore, the use of the subtests in a battery instead of single measures is the best method currently available to language professionals (Dockrell & Marshal, 2015, p. 121).

In school D where isiZulu was the LoLT, learners preferred using English when given a choice to complete a task in English or isiZulu. Similar findings by Aunio, Mononen, Ragpot and Tòrmänen (2016) showed that learners preferred being assessed in English when faced with numeracy tasks but the choice of English instruction did not necessarily yield to better scores. In this study, learners generally performed better when instructed and items presented in their home language but they did not necessarily excel in the skill on target (Aunio, Mononen, Ragpot, & Tòrmänen, 2016, p. 1). Taylor and Von Flintel (2016) found that the LoLT in the early school years is a contributor to low performance in numeracy skill. A study involving 443 learners in Gauteng concluded that there were significant statistical differences between English first language learners and learners using Setswana, isiZulu and seSotho in a standardised math scale (Aunio, Mononen, Ragpot, & Tòrmänen, 2016, p. 1). Their results established a link between learning numerical concepts in English and achievement in mathematics. Since language development is one of the contributors to low performance in numeracy skills, it is important to establish which language skills have direct links to numeracy (Kleemans, Segers, & Verhoeven, 2011). The current study took a step towards achieving this goal by including three subtests that were dedicated to numeracy-based language concepts. The BBL-BLD assessed numerical vocabulary, data handling, word sums and problem solving in both isiZulu and English. Therefore, language assessment in this context highlighted the complexity involved in using language for learning as opposed to using language for communication.

Language structure was not the subject of study in this project yet it is important for academic purposes, especially for non-isiZulu speakers. Research evidence suggests that complex grammatical structures in morphology, syntax, nouns and passive construction are well developed in isiZulu and Sotho children by age 5.5 years (Bortz, 2012). Articulation skills of isiZulu speaking children is achieved by the age of three years (Kunene, 1999, p. 37). Although further research is required, there is an indication that language and articulation skills in African languages are generally developed early. When delays in language skills are observed in school aged children, it will likely not indicate a general developmental delay or language impairment in the home language. Language assessment in the academic context

also provides an opportunity to determine where the learner is in the process of becoming bilingual.

8.10 Educational Implications

There is a lack of prevalence studies on L-b LD in South Africa. It is understandable that teachers may find it difficult to understand the nature of L-b LD and confuse it with typical developing bilingual learners. According to a study by Govender (2009) teachers believe that bilingual learners in general have a difficulty transferring information that they have learnt in English to their L1 (Govender, 2009, p. 100). Teachers also perceived learners to be "*cognitively challenged in reading, writing and comprehension*" (Govender, 2009, p. 143). Other English language difficulties noted in bilingual learners included poor pronunciation of words, poor use of figurative language and poor grammar in English (Govender, 2009).

This study suggests that literacy skills are based on language capabilities. The BBL-BLD evaluated language processing skills such as word association, numerical problem solving, story comprehension and word sums. The learners showed mixed abilities in these tasks and did not necessary perform better in their home language. However, assessing learners in both languages proved to be necessary and assists in developing a profile of strengths and weaknesses for individual learners. The report of the PRAESA (2017) seminar emphasises that learning should be constructed from what children can do (Project for the Study of Alternative Education in South Africa, 2017, p. 3). Therefore, clinical language assessment should start with what learners can do. In this way assessment is a positive process rather than a negative and discouraging one. Teaching staff and school based SLTs need to learn how to assess learners with L-b LD more accurately using positive assessment. Clinical language assessment should seek the potential to learn which, should identify opportunities to learn in the classroom. Ongoing evidence should be collected by the teaching staff and SLTs to use for assessment and intervention planning. Teachers have a role to play in identification of specific areas of difficulties that will contribute to a measurable assessment and a profile of a learner with L-b LD.

The impact of subtractive bilingualism could be seen in comparisons of scores by grades in *following direction* in English, *phonological awareness, reading and doing, story comprehension*. Educators need to see the advantage of bilingualism as building concepts for literacy and to encourage learners to use isiZulu in the classroom in order to process

information. Multilingualism has been found to positively impact on the learner's cognitive development and information processing ability (Bialystok, Luk, & Kwan, 2005). Moreover, the level of bilingualism and orthographic transparency of the language of literacy has been found to mediate both cognitive development and cognitive processing skills of bilingual children (Grosjean, 2009). This study emphasises the separate roles of language as a means for communication and a tool for learning. Teachers and school based SLTs need to develop language for both communication and for literacy.

Since the educators have a challenge differentiating between L-b LD and developing language structure in bilingualism or ESL, it is important to get parents more involved in language development. Recommendations from the PRAESA (2017) seminar included using innovative ways of including family and community members in interactions that are informally structured and intimate (Project for the Study of Alternative Education in South Africa, 2017, p. 8). I would further suggest that when assessing learners for purposes related to literacy and academic achievements, SLTs need to also employ innovative ways of involving parents. Clinical language assessments should not be a once off event but a process. Involving parents could mean allowing parents more time to observe language behaviours at home and relate to daily academic performance. SLTs can use guiding questions for observations to be informed.

8.11 Implications for Theory

The development process of the language tool used in this study confirms that the systems approach to L-b LD is an appropriate one to use. The following factors contribute to the learner's L-b LD profile: teaching methods, school culture, language experiences, language choices, teachers' and family's perception of language impairment. The failure to achieve in language processing tasks must be analysed in the light of the complete system of factors that actually influence the learner's language skills over time.

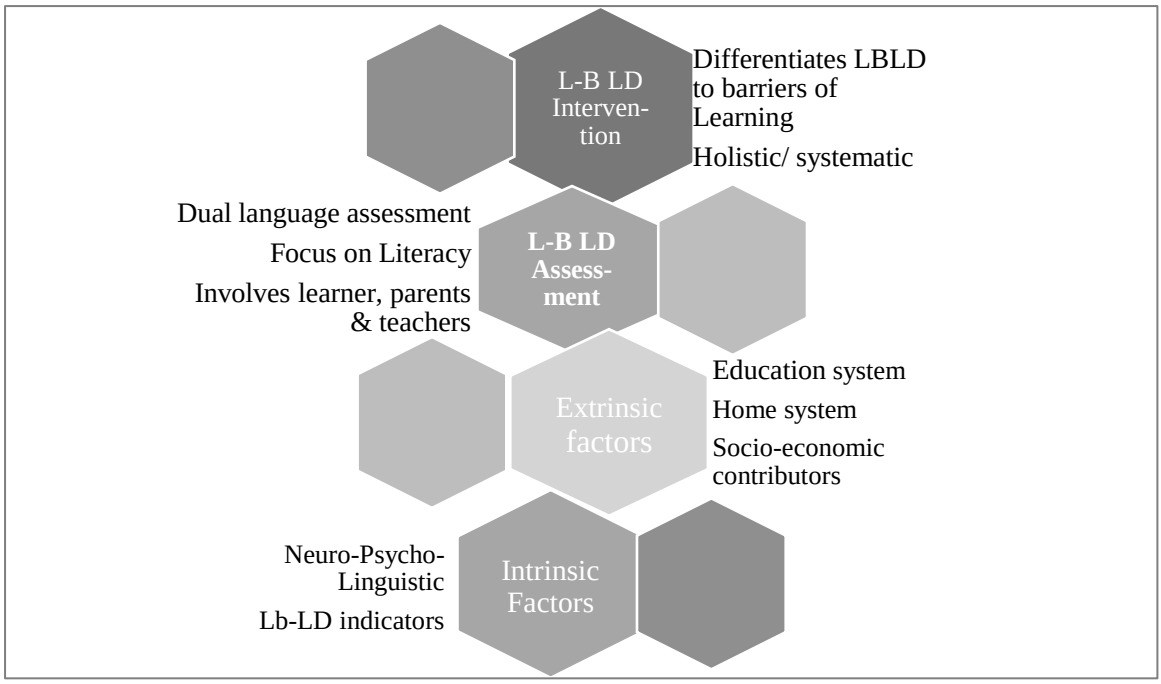


Figure 8. 2 The Integrated Systems of Lb-LD

Figure 8.2 demonstrates that the systems that influence a child with L-b LD are integrated. Adopting theories of learning as a framework for assessment allows for meaningful assessment with the focus on literacy. Understanding how language and learning develops enlightens of what is disrupted in language processing which is preventing learning. The systems approach denotes that there is no direct relationship between one context and the learner with L-b LD. However, multiple systems contribute to the learner's success. Learning to read and write is both a psycho-linguistic and a social process (Trudell & Schoeder, 2006). The neuro-psycho-linguistic perspective, views learning as occurring within the learner and depends mainly on their intrinsic abilities hence the evaluation of intrinsic abilities (Frijters, et al., 2011). The combined neuro-psycho-social indicators of L-b LD filters facts for assessment so that bilingual learners presenting with typical language development patterns can be isolated from those with L-b LD. The purpose of clinical language assessment with the BBL-BLD is to amalgamate factors within each learner's L-b LD system and use this knowledge to formulate the learner's profile.

Concurrently, language processes for higher order cognitive purposes are developmentally interdependent as they are context reduced and cognitively demanding (Butler & Silliman, 2008). From a socio-linguistic perspective, the integration of the learner's micro-environments may either impede or facilitate learning (Furst-Bowe, 2011). Hence, the

inclusion of the teacher questionnaire as part of the tool. From a socio-cultural perspective, learning processes are not independent of the sociocultural context instead they are made up of the context of which they are a part (Vygotsky, 1978). Hence, the socio-cultural questions which enquire about the interaction of the home, school and community. Therefore, the degree to which these results can be generalised is a function of the theoretical framework used, the learning contexts as well as the social and cultural contexts. As a result, the concept of generalizability may have a more limited reach at this stage of data capturing in South Africa but instead such results have significant implications for future knowledge use.

8.12 Conclusion

Some universal early indicators of L-b LD were found to be relevant for the isiZulu-English speaking learners in this study. There were discrepancies observed in familiarity with some language skills tested, discrepancies in performance in skills tested in isiZulu and English, and discrepancies in performance of learners in mainstream and remedial schools. Sensitivity to isiZulu language orthographic properties was recommended. The evaluation of the BBL-BLD suggests that the tool meets the universal principles of a large scale language assessment tool. The outputs of this study, include linguistic and cultural guidelines, teacher questionnaire, components of a parent questionnaire and subtests for the assessment of the language skills in bilingual isiZulu-English learners with L-b LD.

One of the principle criteria for scientific research is that findings must be generalizable across settings of similar nature (Lund, 2013, p. 445). For educational research this is even more important because of population heterogeneity (Ercikan & Wolff-Michael, 2014, p. 1). However, the results obtained using the BBL-BLD should not be compared to results from other studies using non-African languages by virtue of the linguistic system differences. The BBL-BLD is at a developmental stage. There are a number of areas that require further research and analysis. The success of the language tool will depend on the intervention decisions based on its results. Its administration, interpretation, validity and reliability across different cultural and linguistic groups is of the utmost importance (De Sousa, Greenop, & Fry, 2010, p. 166). The findings clearly indicate that that the tool is not ready for application in all learning contexts for isiZulu-English speakers with L-b LD. This research claims that the BBL-BLD is an innovative original tool that will contribute significantly to the field of L-b LD.

CHAPTER 9

CONCLUSION

9.1 Introduction

The definition that was embraced in this study was that language-based learning disabilities are problems with age-appropriate reading, spelling, and writing (ASHA, 2015:1). This study accepted that language-based learning disabilities are a subgroup of learning disabilities that are rooted in deficiencies pertaining to the acquisition of spoken and written language. Language-based learning disabilities (L-b LD) are also known as specific learning disabilities. They manifests in multiple domains of academic functioning but primarily in the domain of literacy such as vocabulary acquisition, reading and writing (National Center for Learning Disabilities, 2013). For the purposes of this study, L-b LD refers to specific and non-specific learning disabilities. They include dyslexia, dyscalculia and dysgraphia, considering that language proficiency is the underlying cause of the individual's difficulty and not specific to a skill. The central research question of this study sought the answer to how can a linguistically and culturally appropriate language assessment tool be developed and validated to detect and evaluate early indicators of language-based learning disorders in grades 1, 2 and 3 bilingual isiZulu-English speaking learners?

9.2 Research Summary

The controversies around the definitions of language-based learning disability (L-b LD) were discussed in detail in chapter 2 of this report. Chapter 2 also introduced the systems that contribute to the profiles that help to identify L-b LD. These are the education, language, culture and communication pathology systems. The profiles include developmental, learning, phonotypic and cultural factors that constitute the learner. Three learning theories were discussed in the chapter 3 and were found to play a critical role in language for learning and in learning other skills. The language learning theory asserts that the ontogenesis of language is the ontogenesis of learning. The socio-cultural theory emphasises the assessment of children in the light of their linguistically and culturally diverse environments. The neurological theory focuses on the foundational intrinsic elements of learning. The use of the combination of these theories as the framework of this study facilitated psycho-linguistic assessments that is culturally sensitive.

The theoretical framework illustrates that the building blocks that are relevant for language development and learning are contained within the learner's microsystem. These include the learner's core cognitive and language skills that are identified through the L-b LD indicators. The fundamental elements that affects learning such as family or home, school and community form the learner's mesosystem. The interaction of the various systems were illustrated by the macrosystem. The chronosystem which entails the political, economic, social and natural changes that occur over time have an effect on all systems and affect planning, budgeting and intervention programmes for learners with L-b LD.

The methodology laid out the cyclical process of the development of the Bilingual Battery for Language-Based Learning Disabilities (BBL-BLD). The language tool development occurred over three phases including pretesting with available tools, blueprint development, trials in five locations, modification of five drafts and quantitative evaluation of the findings for validity and reliability. The pre-testing results assisted the researcher to make a decisions regarding the type of subtests to assess in the proposed L-b LD test to make it relevant for the South African population. The BBL-BLD targeted assessment of five broad learning areas and constructs contained in fifteen (15) subtests.

The results from the second phase of the study provided crucial information about the tool structure, its content and administration. The continuous modifications to the tool allowed for improvement in the clarity of instructions, tasks, scoring and analysis. Thus, the results reflect the adequacy of the tool to assess L-b LD indicators. Although the impact of the learning environment, culture and language were considered in each setting, the focus of analysis was the tool and not the learners. The third phase of the study focused on assessment results of 25 learners who were positively identified as having L-b LD and assessed with the fifth draft of the tool. The results in phase 3 indicate that a few subtests of the tool were reliable, demonstrated test-retest consistency and obtained specific results in different schools.

The results from the two schools that could be matched in the trial and development phase revealed some patterns of strengths or weakness of subtests observed through the performance of learners. The results indicated that, generally, the lowest scores were obtained for the language expression and working memory tasks. These were common weaknesses for the grades 1, 2 and 3 in the target schools. The results implied that assessing the learners in

both English and isiZulu was necessary to extract the L-b LD constructs. The trial sessions indicated both strengths and weaknesses of subtests of the tool. Although the results are not entirely indicative of a language profile of isiZulu speaking learners with L-b LD, the findings from the phase three provide a clear pattern of difficulties and strengths. There is a pressing obligation for establishment of equivalence of the concepts assessed for reliable application to another language and for literacy (Koch, 2009, p. 315). It is critical to determine the relevance and interaction of some of the universally accepted early indicators of L-b LD. This study challenges the typical applicability of indicators such working memory and phonological awareness for differentiation of L-b LD in learners who are isiZulu-English speakers. Not just because of linguistic differences between English and isiZulu but for the design of the tasks and their interpretation. The study maintains that SLTs must reconsider the perception that there are deficiencies in the learner and redefine assessment to show strengths.

9.3 Summary of Key Findings

a. Early indicators of L-b LD were identified and categorised into five main categories to match the learning competencies for foundation phase in South Africa. These were listening skills, language (expressive and comprehension); reading, written language and numeracy based language concepts.
b. The components of existing tools that could be culturally appropriate for bilingual isiZulu-English speaking learners in grades 1, 2 and 3 were found to be the test constructs of following directions, word association, phonological awareness, number repetition.
c. The extrinsic variables that had a significant impact on language evaluation for isiZulu primary school learners were the school environment, the language of learning and teaching, the individual learner's contextual factors including exposure to formal assessment and competency in the English language.
d. The pilot study indicated that universally established indicators of L-b LD such as rhyming and working memory needed to be examined further in the tool development and trial phase.
e. Generally, the performance in expressive, receptive language, working memory and numerical problem solving tasks were poor in all schools tested during the tool trials.

f. The overall areas of strengths were in following directions, reading fluency and comprehension, numerical vocabulary.
g. The L-b LD constructs that were affected the most by sociocultural factors were working memory, phonological awareness and reading skills.
h. Working memory tasks were poorly achieved regardless of language used in administration and test items.
i. The assessment of phonological awareness was best observed using pseudo words to avoid linguistic bias in the assessment.
j. The Delphi panel did not reach consensus on the degree of cultural relevance of the illustrations used in the tool. Forty percent (40%) of the team felt the illustrations were familiar objects but not necessarily correspond with isiZulu culture.

9.4 Study Contributions

Developing the BBL-BLD provided me with an opportunity to gain insights into the process of language tool development. The most critical lesson from the process was that language assessment for L-b LD should not be superficial. Gaining a score for a vocabulary test based on a number of known words did not provide with understanding of the language competency nor did testing isolated abilities in numbers, letters or reading provide with information on literacy. It was essential to assess the learners' language and literacy as a whole and not in parts. The second lesson was that a simple comparison of results obtained from a translated tool provided inaccurate results. Therefore when developing an original tool there had to be extreme care taken in vocabulary and picture choices for each language used for bilingual assessment. Use of the same test pictures could have taken away the cultural context of the language under assessment.

The third lesson was there was no room for assumptions in how learners performed based on the language or cultural group in which they belonged. Assessing large groups of learners within the same school provided a good opportunity to observe the diversity amongst members of the same group. It clarified that parallel group comparisons could be done, and comparisons should be limited, to the learners in the same environment, with similar linguistic experiences. Furthermore, it was helpful to obtain data from different settings and diverse groups. It provided evidence that although the same curriculum is used across the country, its actual application differed from one region to another. It highlighted the

significance of regional and national workshops for educators and school based SLTs as well as the definite need for collaborations amongst professionals. It also suggested that ongoing evidence should be collected by the teaching staff and school based SLTs to use for assessment and intervention planning.

A lesson regarding analysis was that results should be analysed critically and in in fine detail beyond the score. It was tempting to treat the scores of the learners as the ultimate results since the study involved a large number of participants. However, noting the behavioural observations after assessing each learner proved to be a worthy exercise. It helped to later understand the statistics and explain subtle differences in group performances. Since language is both a tool for learning and the means of communication, assessment with the developed tool aimed to evaluate both. The results obtained from the language tool should answer questions about communication and literacy. Furthermore, analysis needed to be both quantitative and qualitative in order to reflect accurate language skills.

Immediate capturing of the results helped to consolidate observed behaviours during assessments with the context and the scores obtained. Analysing the results on the day of assessment helped to identify areas of strengths and weaknesses for each learner. The profile analysis was helpful in identifying strengths as well as weaknesses of each learner and the school. Although research in L-b LD is limited in South Africa, available findings show that there is great linguistic and orthographic variability such that caution needs to be taken when applying what is thought to be universal early indicators.

Regarding phonics and phonological awareness: thorough training and familiarizing the learner with the task is of utmost importance. Training learners in phonics should have been offered before evaluating the learners as schools did not teach reading skills in the same way. The use of pseudo-words may have introduced new linguistic challenges for learners who may have a general language delay. I learnt that pseudo-words could be perceived as a language on its own and assessing learners in this new code could achieve similar outputs as assessing them in English. This is debatable and should be investigated further since pseudo words have a unique role in assessment of reading skills.

Working memory tasks should be administered with caution ensuring that language factors are not under evaluation due to varying experiences with processing verbal information. There needs to be adequate trial items before the assessment is scored. Working memory

assessment and use of pseudo words were challenging for isiZulu-English learners that participated in this study. The lesson I learnt from the process was that as an SLT, one should be weary of own expectations for learners to adhere to existing norms and to avoid judging learner performance in one subtest in isolation. The area of working memory and its interaction with language in bilingual isiZulu speakers needs further exploration.

The study makes the following contributions:

a. This study contributes a culturally fair language tool which can be used to determine the nature of language-based learning disabilities for learners in grades 1, 2, and 3 who speak isiZulu and English in KwaZulu-Natal.
b. The study also contributes a means of identifying and monitoring learners with L-b LD.
c. This study provides guidelines for linguistically and culturally appropriate language assessment.
d. The study provides a template for developing a culturally and linguistically appropriate tool for the South African learners including a template for socio-economic questionnaire for parents.
e. The outputs of this study which are the BBL-BLD, the teacher questionnaire, components of the parents' questionnaire, and the language and cultural guidelines. The guidelines can be used in development of other language tools for other African languages.
f. The teacher questionnare is a significant output as it can be used in isolation.
g. This study contributes practical knowledge of the process of language tool development including logistical, ethical, linguistic and theoretical considerations.
h. This study adds valuable data which can be used to study further in the field of linguistics, education, child health, speech –language pathology and others.

9.5 Limitations of the Study

a. The research questionnaire was not thorough in probing cultural factors. Information about other languages spoken in the home and classroom, the dominant religious and cultural beliefs were not included.
b. The involvement of parents in the development of the teacher questionnare was limited. This limitation might have influenced the cultural appropriateness of the questionnaire.

c. The reliability (dependability) of scoring method used in the tool was not conducted.
d. The questions probing literacy levels of the parents or caregivers were inadequate.
e. Some dominant isiZulu dialects were not included in the study as the South coast of KwaZulu-Natal was not included.
f. Generalisability of results is limited to KwaZulu-Natal as the sample was not sufficiently large to compute normative data.
g. There was a limited age range involved in the study.
h. There was an absence of a valid gold standard test to compare the results to.
i. Rhyming not followed though
j. Further approaches to testing using positive assessment, test did not provide clear guideline how to focus on strengths although they can be identified.

9.6 Recommendations for Future Research:

a. The prevalence of specific L-b LD need to be established in South Africa.
b. The key indicators for L-b LD need to be evaluated in other South African languages.
c. There is an urgent need to develop a South African set of norms for knowledge of patterns, shapes, colours, letters and numbers to guide interpretation of the results on these tasks.
d. Parent-teacher concordance studies on questions relating to identification and treatment of language-based learning disabilities.
e. The nature of rhyming skill in isiZulu need to be scrutinised further as well as the impact of rhyming on pre-reading and writing skills.
f. The revised working memory subtest need to be put to trial and finalised for immediate use as there is an urgent need for such a tool.
g. Further research into the nature of language uses in the homes and communities of bilingual learners in South Africa.
h. Further research into learning strategies employed by bilingual learners in the foundation phase.
i. Further research into how educators can be co-opted in the accurate identification and assessment of learners with L-b LD.

9.7 Conclusion

Clinical language assessment is essential for identification of language-based learning disabilities. Defining the term learning disability clearly and conceptually is critical in order to understand the difference between barriers to learning and specific language-based learning disabilities. There is a lack of appropriate language assessment tools for L-b LD in South Africa, especially for indigenous African languages. This study developed a culturally and linguistically appropriate language tool for use with isiZulu-English speaking learners in the foundation phase of primary school.The learner with L-b LD is surrounded by many systems which affects his or her performance and success in education. The neuro-psycho-social, communication, linguistic, cultural and the education systems were found to interact for a learner with L-b LD. The allied health workers such as the speech-language therapists (SLTs) and educational psychologists are important team members within the education support services. Thus, the language challenges and the application of the inclusive education policy not only affect the learners and the educators but influences clinical practice of the allied health professionals working in support of the education system. Changing the focus of intervention from impairment which is problem centred, to participation, which is learner centred will be challenging for SLTs who are satisfied with only identifying problems and weaknesses.

Clinical language assessment for Lb-LD should consider the profiles contributed by all the systems to lead to differentiation and relevant intervention. A Culturally appropriate assessment tool considers each learner as an individual, in the context of his or her social, economic and educational environment, their family and their community. The development of a culturally and linguistically fair assessment tool for bilingual learners is necessary to identify strengths of the home language and how it can be used to develop literacy. Clinical language assessment should take account of the local contextual and cultural factors, the stages of language development, the level of bilingualism, the learner's potential when stimulated and participation of the learner in other systems over time.

This research identified the key indicators that are relevant for the differential diagnosis of L-b LD for isiZulu speaking learners. It concluded that the identified indicators were applicable to isiZulu speaking and bilingual isiZulu-English learners. It determined guidelines for linguistically and culturally appropriate assessment of learners in grades 1, 2 and 3. The study

concluded that the BBL-BLD tool had strengths and there were areas that require further improvements. The tool reliability findings were based on a small sample of 17 learners and illustrated that some subtests produced adequate correlation with the teacher questionnaire while some did not. The developed tool adds valuable data to the body of knowledge in the field of speech-language pathology, education, applied linguistics and child health. A uniform model for teaching, assessing, analysis and intervention for language skills in South Africa could be impractical. Speech-Language Pathologists need to be flexible to the idea of assessing literacy skills like listening, reading, comprehension and numeracy as these are rich in language information and critical for differentiation.

REFERENCES

Abosi, O. (2007). Educating Children with Learning Disorders in Africa. *Learning Disability Research & Practice*, 22(3),196-204. https://doi.org/10.1111/j.1540-5826.2007.00242.x

Abubakar, A., Holding, P.; van Baar, A., Newton, C., & van der Vijver, F. (2008). Monitoring Psychomotor Development In A Resource-Limited Setting: An Evaluation of the Kalifi Developmental Inventory. *Ann Trop Paediatr., 28*(3), 217-226.

Aimin, L. (2013). The study of Second Language Acquisition Under Socio-Cultural Theory. *Education, 1*(5), 1-12. Retrieved Nov 3, 2017, from Http://Pubs.sciepub.com/education/1/5/3

Alborz, A., McNally, R., & Genniding, C. (2010). Access To Health Care For People With LD In The UK: Mapping Issues And Reviewing Evidence. *Journal of Research in Nursing, 15,* 351-201.

Alcock, K., & Alibhai, N. (2013). Language Development in Sub-Saharan Africa. . In Giodarni. B. & Boivin M.J, (Eds). *Neuropsychology of children in Africa* (pp. 155-180). New York: Springer.

Alcock, K., Ngorosho, D., Deus, C., & Jukes, M. (2010). We Dont Have Language At Our House: Disentangling The Relationship Between Phonological Awareness, Schooling and Literacy. *British Journal of Educational Psychology, 80*(1), 55-76. doi:10.1348/0007099909X424411

Alduals, A., Shoeib, R., Al-Hammadi, F., Al-Maiki, K., & Alenezi, F. (2012). Arabic Comparision: Measuring Pragmatic Language In Children With Developmental Dysphasia Comparing Results Of Arabic TOPL 2 and CELF-4 (PP & ORS). *International Journal of Linguistics, 4*(2), 478.

Alexander, N. (2005). The Impact of The Hegemony of English on Access To and Quality of Education With Special Reference To South Africa. *Language and Poverty Conference: Cornell University* (pp. 1-12). New York: PRAESA.

Alfonso, V., Flanagan, D., & Radwan, S. (2005). The Impact of the Cattell-Horn-Carroll Theory on Test Development and Interpretation of Cognitive and Academic Abilities. In D. H. Flanagan, Harrison. D., & Flanagan. P. (Eds.), *Contemporary Intellectual Assessment, Second Edition: Theories, Tests, and Issues* (pp. 185-202). New York: Guildford Publications.

Alloway, T., Gathercole, S., Adams, A., Willis, S., Eaglen, R., & Lamont, E. (2005). Working Memory and Phonological Awareness Predictors of Progress Towards Early Learning Goals At School Entry. *British Journal of Developmental Psychology, 23*(3), 417-426.

Alt, M., Arizmendi, G., & Beal, C. (2014). The Relationship Between Mathematics and Language: Academic Implications For Children With Specific Language Impairment. *Language Speech Hearing Services In Schools, 45*(3), 220-233. doi:10.1044/2014-LSHSS-13-0003

Althouse, L. (2017). *Test Development: Ten Steps To A Valid and Reliable Certification Exam.* NY: SUGI 25, SAS Institute.

American Speech-Language Hearing Association . (1993). *Definitions of Communication Disorders and Variations.* Retrieved May 22, 2015, from asha.org: Http://www.asha.org./policy/rp19930208.htm#_ga=1.6761906.1486527649.1379431210

American Speech-Language Hearing Association. (2002). *Reading and Writing (Literacy).* Retrieved June 15, 2015, from http://www.asha.org/public/speech/development/Literacy/

American Speech-Language Hearing Association. (2007). *American Speech-Language Hearing Association Practice Policy*. Retrieved May 26, 2014, from Technical Report 2007: http://www.asha.org/ASHApracticepolicy

American Speech-Language Hearing Association. (2015). *Language Based Learning Disabilities (Reading, Spelling, Writing).* Retrieved 05 22, 2015, from asha.org: http://www.asha.org/public/speech/diorders/LBLD

Anthony, J., Anthony, T., & Dunkelberger, M. (2011). What Factors Place Children With Speech Sound Disorders At Risk For Reading Problems? *American Speech and Hearing Association* (pp. 1-31). San Diego, CA: ASHA.

Armbruster, B., Lehr, F., & Osborn, J. (2003). *Put Reading First: The Research Building Blocks of Reading Instruction.* Jessup: MD: National Institute for Literacy.

Aunio, P., Mononen, R., Ragpot, L., & Tòrmänen, M. (2016). Early Numeracy Perfomance of South African School Beginners. *South African Journal of Childhood Disorders.* 6 (1).1-10. Retrieved from http:// www.sajce.co.za.

Australian Institute of Health and Welfare. (2004). *Children With Disabilities In Australia.* Canberra: Australian Institute of Health and Welfare. Retrieved March 2, 2017, from www.aihw.gov.au

Baddely, A. (2003). Working Memory and Language: An Overview. *Journal of Communication Dissorders, 36*, 189-208. Retrieved from http://faculty.biu.ac.il/~armonls/924/NWR/baddeley.pdf

Baddely, A., Gathercole, S., & Papagno, C. (1998). The phonological Loop As A Language Learning Device. *The Psychology Review, 105*(1), 158-173.

Banathy, B. (1996). Systems Enquiry and its Application In Education. In Jonassen. D. H., *Handbook of Research For Educational Communications and Technology.* New York: Macmillan.

Bangirana, P., John, C., Idro, R., Opoka, R., Byarugaba, J., Jurek, A., & Boivin, M. (2009, 11 19). Socio-economic Predictors of Cognition in Ugandan Children: Implications for Community Interventions. *Plos One, 4*(11), e7898.

Battle, D. (2000). Becoming a Culturally Competent Clinician. *Perspectives on Communication Disorders and Sciences in Culturally Diverse Populations, 6*, 19-22. doi:10.1044/cds6.3.9

Battle, D. (2012). *Communication Disorders In Multicultural And International Populations,* (4th ed.). St louis,Mo: Elsevier. Retrieved 10 13, 2016, from www.sciencedirect.com

Battle, D. (2012). *Cultural Competency.* Retrieved from ASHA: www.asha.org

Battle, D. (2016). On Being Culturally Competent In A Multicultural/ Multilinguistic World. *SASHLA-ENT conference.* Johannesburg: ICC.

Bedore, L., & Pena, E. (2008). Assessment of Bilingual Children for Identification of Language Impairment: Current Findings and Practice. *International Journal of Bilingual Education and Bilingualism, 11*(1), 1-29. Retrieved from https://eric.ed.gov/?id=EJ789224

Bertalanffy, L. V. (2013, December). The History and Status of General Systems Theory. *JSTOR*, 407-429. doi:193.10.199.184

Bialystok, E., Luk, G., & Kwan, E. (2005). Bilingualism, Biliteracy and Learning to Read: Interactions Among Languages and Writing systems. *Scientific Studies of Reading, 9*(1), 43-61. Retrieved from www.oalib.com/references/14749535

Bloch, C. (2000). *Multilingual Education or English As A Medium of Destruction: Language and Literacy Policy and Practice In South African Early Childhood Classrooms.* Project For the National Reading Panel. Cape Town: PRAESA. Retrieved from www.praesa.org.za>pubications> conference papers and presentations

Bolt, S., & Thurlow, M. (2004). Five of the Most Frequently Allowed Testing Accomodations in State Policy. *Remedial and Special Education, 253*. Retrieved 03 24, 2014

Bortz, M.A. (1995). *A Language Assessment for Preschool Zulu Speaking Children [Masters dessertation]*. Johanesburg: University of Witwatersraand.

Bortz, M.A. (2012). *The Acquisition of the Passive By Setswana-Speaking Preschoolers. [Doctorate Thesis]*. Johannesburg: University of Witwatersraand.

Bose, K., & Seetso, G. (2016). Science and Mathematics Teaching Through Local Games in Preschools in Botswana. *South African Journal of Communication Disorders, 6*(2), 1-11.

Brea-Spahn, M. (2014). Circles of Knowledge and the Challenge of Individual Profiles for Bilingual Students with Language Learning Disabilities. Orlando, Fl.: ASHA. Retrieved 2015, from www.asha.org/events/convetion/handouts/2014/PC01-Brea-Spahn/

Broeder, P., Extra, G., & Maartens, J. (2002). *Multilingualism in South Africa with a Focus on KwaZulu-Natal and Metropolitan Durban.* Cape Town: PRAESA, University of Cape Town.

Bronfenbrenner, U. (1994). Ecological Models of Human Development. *International Encyclopedia of Education, 3*(2), pp. 37-43.

Brofenbrenner, U & Morris, P.A. (2007). The Bioecological Model of Human Development. In Damon, W. & Lerner,R (Eds). *Handbook of Child Psychology 1:16.* New York: John Wiley & sons

Bryant, P., Bradlely, L., MacClean, M., & Crossland, J. (1989). Nursery Rhymes, Phonological Skills And Reading. *Journal of Child Language, 2*. Retrieved from www.mgol.net/about/what-makes-mgol-unique/the-value-of-nursery-rhymes

Burns, R. (1995). *The Adult Learner at Work.* Sydney: Business and Professional Publishing.

Butler, K., & Silliman, E. (2008). *Speaking, Reading and Writing in Children with Language Learning Disabilities: New Paradigms in Research and Practice.*

Cahan, S., Fono, D., & Nirel, R. (2012). The Regression-Based Discrepancy Definition Of Learning Disability: A Critical Appraisal. *Journal of Learning Disabilities, 45*(2), 172-178. Retrieved May 13, 2016, from www.iapsych.com/articles/cahan2012.pdf

Cardoso, J., Pereira, M. L., & Ramos, A. (2014). What Is Gold Standard and What Is Ground Truth? *Dental Press Journal of Orthodontics, 19*(5), 27-30. doi:10.1590/2176-9451.19.5.027-030

Carter, J., Lees, J., Murira, G., Gona, J., & Neville, B. a. (2005). Issues in Development of Cross-Cultural Assessment of Speech and Language for Children. *International Journal of Language and Communication Disorders, 40*(4), 385-401.

Carter, N., Bryant-Lukosius, D., & DiCenso, A. (2014). The Use of Triangulation In Qualitative Research. *Oncology Nursing Forum, 41*(5), 545-547. Retrieved from www.web.b.ebscohost.com

Chan, C. (2008). Overview of Specific Learning Disabilities (SLD)/ Dyslexia Developments Over the Last Decade in Hong Kong. *Hong Kong Journal of Peadiatrics (New Series)* (13), 196-202. Retrieved April 18, 2017, from http:hkjpaed.org

Clemence, N., & Shapiro, E. S. (2011). Improving The Efficacy of First Grade Reading Screening: An Investigation of Word Identification Fluency With Other Early Literacy Indicators. *School Psychology Quarterly, 26*(3), 231-244. Retrieved from psycnet.apa.org

Clendon, S., & Erickson, K. (2009). Literacy Instruction For Individuals With Complex Communication Needs. *Acquiring Knowledge in Speech, Language and Hearing, 11*(2), 77-80.

Cockcroft, K., & Alloway, T. (2012). Phonological Awareness and Working Memory: Comparisons Between South African and British Children. *Southern African Linguistics and Applied Language Studies, 30*(1), 13-24.

Cockcroft, K., Alloway, T., Copello, E., & Milligan, R. (2015). A Cross Cultural Comparison Between South African and British Students With The Weschler Adult Intelligence Scale, Third Edition (WAISS III). *Frontier Psychology*, 1-15. Retrieved from frontiersin.org/articels/10.3389/fpsychg.2015.00297/full

Cohen, A., & Wollack, J. (2015). *Handbook on Test Development: Helpful Tips for Creating Reliable and Valid Classroom Tests.* Madison: University of Winconsim-Madison.

Cooper, D., & Schindler, P. (2008). *Business Research Methods* (10 ed.). Boston: McGraw Hill.

Courage, M., & Cowan, N. (2009). *The Development of Memory in Infancy and Childhood* (2nd ed.). New York: Psychology Press.

Courter, M. (2010). Finding Academic Success for Students with Language-Based Learning Disabilities. *ASHA* (pp. 1-20). Philadephia: ASHA. Retrieved June 4, 2014, from www.asha.org>2010-archive

Cummins, J. (2008). BICS and CALP: Empirical and Theoritical Status of the Distination. In Street B and Hornberger N,H (Eds) Encyclopedia of Language and Education Literacy. *Springer Science.*, 71-83.

De Graaff, S., Hassleman, F., Verhoeven, L., & Bosman, A. (2010). Phenomic Awareness In Dutch Kindergartners: Effect Of Task, Pheneme Position, Pheneme Class. *Research Gate*. doi:10.1016/j.learninstruc.2010.02.001

De Lamo White, C., & Jin, L. L. (2011). Evaluation of Speech and Language Assessment Approaches With Bilingual Children. *International Journal of Language & Communication Disorders, 6* (Nov-Dec), 613-627. doi:10.1111/j.1460.2011.00049

De Sousa, D., Broom, S., & Fry, A. (2011). Cross Language Transfer of Spelling Strategies in English and Afrikaans Grade 3 Children. *International Journal, 14*(1), 49-67. doi:org/10.1080/13670051003657959

De Sousa, D., Greenop, K., & Fry, J. (2010, February 02). The Effect of Phonological Awareness of Zulu Speaking Children Learning How to Spell English. *British Journal of Educational Psychology, 80*, 517-533. Retrieved from www.

Dempster, E., & Reddy, V. (2007). Item Readability and Science Achievement in TIMMS 2003 in South Africa. *Wiley Periodicals Inc. Sc Ed., 91*, pp. 906-925.

Demuth, K., & Suzman, S. (1997). Language Impairment in Zulu. *21st Annual Boston University Conference on Language Development.* Somerville, MA. Retrieved from http://www.cog.brown.edu/People/demuth/Articles/1997%20Demuth&Suzman.pdf

Department of Education. (2002). *Revised National Curriculum Statement Grades R-9 (schools).* Pretoria: Department of Education.

Department of Education. (2005). *Guidelines for Inclusive Learning Programmes.* Pretoria: Department of Education.

Department of Education. (2008). *Reviews for National Policies on Education in South Africa.* Pretoria: Department of Education.

Department of Education (2008). *Annual Report 2008-2009 KwaZulu-Natal.* Pietermaritsburg: Department of Education.

Department of Basic Education. (2012). *KwaZulu-Natal Annual Report 2011-2012.* Pietermaritsburg: Department of Education KwaZulu-Natal. Retrieved February 11, 2016, from http://www.kzneducation.gov.za

Department of Basic Education. (2012). *National Curriculum Statement National Policy Pertaining to the Programme and Promotion Requirements of the National Curriculum Statement Grades 1 to 12.* Pretoria: Department of Education.

Department of Basic Education. (2014). Report on the Annual National Assessment of 2014. Retrieved from earlychildhood-takalanisesame.co.za

Dibetso, T., & Smith, T. (2012). *Lack of Diversity (repeat) Analysis of SABC News and Programming.* Johannesburg: Media Monitoring Africa.

Dockrell, J., & Marshall, C. R. (2015). Measurement Issues: Assessing Language Skills in Young Children. *Child and Adolescent Mental Health, 20*(2), 116-125.

Doke, C. (1954). *The South African Bantu Language Linguistics.* Johannesburg: University of Witwatersraand.

Dunbar-Krige, H., & van der Merwe, M.(2010). The Teacher As An Agent Of Inclusivity. In Conley, L.; de Beer, J.; Dunbar-Krige, H.; du Plessis, E.; Gravett, S.; Lomofsky, L.; Mercekel, V. November, I.; Osman, R.; Petersen, N. Robinson, M. Van der Merwe, M. *Becoming a teacher* (pp. 161-182). Cape Town: Heineman.

Dunn, L. M., & Dunn, L. M. (1997). Examiners Manual for the PPVT-III Peabody Picture Vocubulary Test: Form IIIA and Form IIIB. American Guidance Service.

Emerson, E., & Hatton, C. (2008). *People with Learning Disabilities in England.* CEDR. London: C-eprints. Retrieved September 10, 2014, from www.C-eprints.lancs.ac.uk

Emerson, E., & Heslop, A. (2010). *A Working Definition of Learning Disabilities.* Improving Health & Lives Observatory. London: IHAL. Retrieved September 10, 2014, from www.improvinghealthandlives.org.uk

Engelbrecht, P., Nel, M., Nel, N., & Tlale, D. (2015). Enacting Understanding of Inclusion In Complex Contexts: Classroom Practices Of South African Teachers. *South African Journal of Education, 35*(3), 1-10. doi:10.15700/saje.v35n3a1074

Engle, R., Tuholski, S., Laughlin, J., & Conway, A. (1999). Working Memory, Short Term Memory and General Fluid Intelligence: A Latent Variable Approach. *Journal of Experimental Psychology: General, 128*, 308-328.

Ercikan, K., & Wolff-Michael, R. (2014). Limits of Generalizing in Education Research: Why Criteria For Research Generalization Should Include Population Heterogeneity And Uses Of Knowledge Claims. *Teachers College Record, 116*(5), 1-13.

Ertmer, P., & Newby, T. (2013). Behaviourism, Cognitivism, Constructionism: Comparing Critical Features From An Instructional Design Perspective. *Performance Improvement Quarterly, 2*, 43-71. doi:10.1002/piq.21143

Fitzpatrick, E., Whittingham, J., & Duriex-Smith, J. (2014). 20 Year Viewing of Hearing Characteristics and Ideological Practices Before and After New Born Hearing Screening. *Ear and Hearing, 35*(1), 10-18.

Flack, P. (2009). *Citrus Clouds on Planet Goofy:The Reported Experiences of Children with Learning Disability [Doctoral Thesis]*. Durban: University of UKZN. Retrieved from http:researchspace.ukzn.ac.za

Flack, P., Pahl, J., & Mdlalo, T. (2015). Multicuturalism in the Classroom. In S. Moonsamy, & H. Kathard (Eds.), *Speech- Language Therapy in the School Context* (pp. 83-98). Pretoria: Van Schaik.

Flanagan, D., Alfonso, V., & Mascolo, J. (2011). A CHC Based Operational Definition of SLD: Integrating Muliple Data Sources And Multiple Data-Gathering Methods. In D. A. Flanagan, *Essentials of Specific Learning Disability Identification* (pp. 233-298). NJ: John Wiley. Retrieved from www.scholar.google.com

Flanagan, D., Alfonso, V., & Ortiz, S. (2012). The Cross Battery Assessment Approach: An Overview, Historical Perspective, and Current Directions. In D. Flanagan, & P. Harrison, *Contemporary Intellectual Assessment Theories* (pp. 459-483). New York: Guilford Publications.

Flanagan, D., Alfonso, V., & Ortiz, S. (2015, July). *What is XBA?* Retrieved December 04, 2017, from Wileyactual: www.wileyactual.com>2015/07>what-is-XBA.pdf

Fletcher, J. (2009). Dyslexia :The Evolution of a Scientific Concept. *Journal of International Neuropsychological Society*, 501-508.

Fletcher, J., Lyon, G., Barnes, M., Stuebing, K., Francis, D., Olson, R., Shaywitz, B. (2005). Validity of Alternative Approaches For The Identification of Learning Disabilities. *Journal of Learning disabilities*, 27-55. Retrieved from http:www.ncbi.nlm.nih.gov

Foxcroft, C. (2011). Ethical Issues Related to Psychological Testing in Africa: What I have learned (so far). *Online Readings in Psychology and Culture, 2*(2), 1-12. doi:10.9707/2307-0919.1022

Foxcroft, C., & Aston, S. (2006). Critically Examining Language Bias in the South African Adaptation of the WAISS-III. *Journal of Industrial Psycchology, 32*(4), 92-102.

Frijters, J., Lovett, M., Steinbasch, K., Wolf, M., Sevcik, R., & Morris, R. (2011). *Neurocognitive Predictors of Reading Outcomes for Children with Reading Disabilities.* Georgia State University. Georgia: Scholarworks. Retrieved November 3, 2017, from http://scholarworks.gsu/psych_facpub/164

Fuchs, D., & Young, C. (2006). On The Irrelevance of Intelligence In Predicting Responsiveness To Reading Instruction. *Exceptional Children, 74*, 8-30.

Fuchs, D., Deshler, D., & Reschly, D. (2004). National Research Center on Learning Disabilities: Multi- Method Studies of Identification and Classification Issues. *Learning Disabilitiess Quarterlies, 27*(4), 189.

Fuchs, D., Mock, D., Morgan, P., & Young, C. (2003). Responsiveness-To-Intervention: Definitions, Evidence,And Implications For The Learning Disabilities Construct. *Learning Disabilities Research & Practice, 18*(3), 157-171.

Furnham, A., Monsen, J., & Ahmetoglu, G. (2009). Typical Intellectual Engagement, Big Five Personality Traits, Approaches to Learning and cognitive Ability Predictors of Academic Performance. *British Journal of Educational Research*, 769-782. Retrieved from onlinelibrary.wiley.com/doi/10.1348/978185409X412147/

Furst-Bowe, J. (2011). Systems Thinking: Critical To Quality Improvement In Higher Education. *Quality Aproaches in Higher education, 2*(2), 2-4. Retrieved from www.rube.asq.org

Gagiano, S., & Southwood, F. (2015). The Use of Digit And Sentence Repetition In The Identification of Language Impairement. *Stellenbosch Papers in Linguistics, 44*, 37-60. doi:10.5774/44-187

Gardner, M. (2005). *Test of Auditory Processing Skills.* New York: Academic Therapy Publications.

Gascoigne, M. (2008). Change for Children with Language and Communication Needs:Creating Sustainable Integrated Services. *Child Language Teaching and Therapy Journal, 24*(2), 133-154.

Geldenhuys, J., & Wevers, L. (2013). Ecological Aspects Influencing the Implementation of Inclusive Education in Mainstream Primary Schools in the Eastern Cape, South Africa. *South African Journal of Education, 33*(3).

Genesee, F., Geva, E., Dressler, C., & Kamil, M. (2006). Synthesis: Cross-Linguistic Relationships. In D. August, & D. Shanahan (Eds.), *Developing Literacy in Second-Language Learners* (pp. 153-174). Washington D.C: Mahwah, Nj: Erlbaum.

Gilbertson, M., & Bramlett, R. (1998). Phonological Awareness Screening To Identify At-Risk Readers Implication For Practitioners. *Language Speech and Hearing Services in Schools, 92*(2), 109-216. Retrieved from www.lshss.pubs.asha.org/article.aspx?articleid=1780184

Gillon, G., & McNeill, B. (2007). *Integrated Phonological Awareness: An Integrated Program for Preschool Children with Speech-Language Impairment.* Christchurch, New Zealand: University of Cantebury. Retrieved April 22, 2017, from http:www.education.cantebury.ac.nz

Gillon, G., & McNeill, B. (2009). Phonological Awareness: Effective Practice in Assessment and Intervention. *Acquiring Knowledge in Speech and Language Hearing, 11*(1), 72-.

Giordani, B., Boivin, M., Nseyila, D., & Lauer, R. (1996). Use of the KABC with Children in Zaire, Africa: An Evaluation of The Sequential Processing Distinction Within An Intercultural Context. *Journal of Disability:Development and Education, 43*(1), 8-24.

Gottardo, A., & Grant, A. (2008, January). Defining Bilingualism. *Literacy Encyclopedia*, pp. 1-7. Retrieved April 7, 2017, from http://www.literacyencyclopedia.ca

Gottardo, A., Collins, P., Gebotys, I., & Baclu, R. (2008). Predictors of Grade 2 Word Reading and Vocaabulary Learning From Grade 1 in Spanish Speaking Children: Similarities and Differences. *Learning Disabilities and Practice, 23*(1), 11-24. Retrieved from onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2007.00259.x/abstract

Govender, R. (2009). *Isizulu Speaking Foundation Phase Learner's Experiences Of English As A Second Language In English Medium Schools [Masters Thesis]*. Pretoria: UNISA.

Gray, S. (2004). Word Learning By Preschoolers with Specific Language Impairment-Predictors and Poor Learners. *Journal of Speech and Hearing Research, 47*, 1117-11130.

Grigorenko, E. (2012). Language Based Learning Disabilities. *Encyclopedia of Sciences of Learning*, 1724-1727.

Grosjean, F. (2009, April). *The Bilingual Family Newsletter*. Retrieved Nov 18, 2017, from www.bilingualfamilynewsletter.com/archives.php

Grosjean, F. (2010). *Bilingual: Life and Reality*. New York: Havard University Press. Retrieved from www.books.google.co.za/

Grover, V. (2000). *Revised Manual for The Grover-Counter Scale Of Cognitive Development (GSC).* Cape Town: HSRC. Retrieved from www.hsrc.ac.za/en/research-outputs/view/537

Gutiierrez, K., D. Lopez, P. B., & Turner, M. G. (1997). Putting Language Back Into Language Arts: When The Radical Middle Meets The Third Space. *Language Arts*, 368-378.

Hakansson, G., Salameh, E., & Nettelbladt, U. (2003). Measuring Language Development In Bilingual Childen: Swedish-Arabic Children With and Without Language Imparment. *Linguistics*, 255-288.

Hakkaraisenen, A., Savolainen, H., & Holopainen, L. (2012). Mathematical and Reading Difficulties As Predictors of School Achievement and Transition To Secondary Education. *Scandanavian Journal of Educational Research*, Online. doi:10.1080/00313831.2012.696207

Halliday, M. (1993). Towards a Language Based Theory of Learning. *Linguistics and Education.*, 93-116. Retrieved 03 14, 2016, from http://www.lchc.ucsd.edu

Hambleton, R., & DeJong, J. (2003). Advances In Translating and Adapting Education and Psychological Tests. *Journal of Testing, 20*(2), 127-143.

Harowitz, S., Rawe, J., & Wittaker, M. (2017). *The State of Learning Disabilities: Understanding the 1 in 5.* New York: National Center for Learning Disabilities. Retrieved from National Center for Learning Disabilities: www.ncld.org>the state of LD

Health Professions Council South Africa. (2007). *Best Practice Guidelines for Newborn and Infant Hearing Screening.* Retrieved 2014, from Health Proffessions Council South Africa: www.hpcsa.co.za/uploads/editor/Userfiles/downloads/speech/draft_guidelines/duid_newbn_infant_hear_screen_draft.pdf

Health Professions Council South Africa. (2012). *HPCSA Bulletin*. Retrieved May 14, 2013, from http://www.hpcsa.co.za/statistics/pub

Holding, P., Abubakar, A., & Kitsao-Wekulo, P. (2010). Where There Are No Tests: A Systematic Approach to Approach to Test Adaptaton. In Landow (Ed.), *Cognitive Impairment: Causes, Diagnosis and Treatments.* ML Nova Sciences Publishers.

Hsu, C., & Sandford, B. (2007). The Delphi Technique: Making Sense of Consensus. *Practical Assessment, Research and Evaluation, 12*(10), 1-8. Retrieved from http://www/pareonline.net

Hsu, C., & Sandford, B. (2012). The Delphi Technique: Use Considerations and Applications in the Converntional Policy and Online Environments. In *Online Research Methods in Urban and Planning Studies: Design and Outcomes* (p. 20). doi:10.4018/978-1-4666-0774-4ch011

Inglis, P., & Cook, T. (2011). Ten Top Tips for Effectively Involving People with Learning Disabilities in Research. *Journal of Learning Disabilities and Offending Behaviour, 2*(2), 98-104.

International Centre for Behavioural Studies. (2012). *Test Transfer And Application: A Structure For Managing and Evaluating The Re-Standardization Process Of Tests Of Cognition, Child Development and Family Influences*. Grand Challenges Canada Saving Brains Program.

Iwai, Y. (2011). The Effects of Metacognitive Reading Strategies: Pedagogical Implications for EFL / ESL Teachers. *The Reading Matrix, 11*(2), 150-159. Retrieved August 15, 2016, from http://www.reading matrix.com

Janse, P., & Greenop, K. (2008). Factor Analysis of the Kaufman ABC Assessed Longitudinally at 5 and 10 Years. *South African Journal of Psychology, 38*(2), 355-363.

Johnson, R., & Onwuegbuzie, A. (2004). Mixed Methods Research: A Research Paradigm Whose Time has Come. *SAGE Journals, 33* (7).

Johnson, R., Turner, L., & Onwuegbuzie, A. (2007). Towards a Definition of Mixed Method Research. *Journal of Mixed Method Research* (April), online version.

Johnstone, C., Altman, J., Thurlow, M., & Thompson, S. (2006). *A Summary of Research on the Effeects of Test Accomodations:2002-2004.* Menealpolis: National Center on Educational Outcomes.

Johnstone, C., Thompson, S., Bottford-Miller, N., & Thurlow, M. (2008). Universal Design and Multi-Method Approaches to Item Review. *Educational Measurement: Issues and Practice, 27*(1), 25-36. doi:10.1111/j.1745-3992.2008.00112

Jordaan, H. (2011). Language Teaching Is No Panacea: A Theoretical Perspective and Critical Evaluation of Language in Education within the South African Context. *SAJCD, 58*(2). Retrieved from www.sajcd.org.za/index.php/sajcd/article/view/29/50

Jordan, N., & Levine, S. (2009). Socio-economic Variation, Number Competence, and Mathematic Learning Difficulties in Young Children. *Developmental Disabilities Research reviews, 16*, 60-68. Retrieved June 5, 2015, from http:www.cogdevlab.uchicago.edu

Juan, A., & Visser, M. (2017, May). Science Achievements in South Africa. *South African Journal of Education, 37*(2), 1-10.

Jukes, M., & Grigorenko, E. (2010). Assessment of Cognitive Abilities in Multiethnic Countries: The Case of the Wolof and Mandika in Gambia. *British Journal of Educational Psychology*, *80*(1), 77-97.

Jung, D. (2007). South Korean Perspective on Learning Disabilities. *Learning Disabilities Research and Practice, 22*(3), 183.

Kallenbach, A. (2007). *Language for Academic Purposes:Performance of Grade One English Second Language (ESL) Learners on the Diagnostic Evaluation of Language Variation (DELV). [Masters Thesis]*. Johhanesburg: University of Witswatersrand. Retrieved from wiredspace.wits.ac.za/handle/10539/45

Kamhi, G. A., & Catts, H. W. (2012). *Language and Reading Disabilities* (3rd ed.). Boston: Pearson.

Karande, S. (2008). Current Challenges in Managing Specific Learning Disabilities in Indian Children. *J.Postgrad Med, 54*, 75-77. Retrieved from www.jpgmonline.com/text.asp?2008/54/2/75/40765

Kathard, H., Ramma, L., Pascoe, M., Jordaan, H., Moonsamy, C., Wium, A., Khan, N. (2011). How Can Speech-Language Therapists and Audiologists Enhance Language and Literacy Outcomes in South Africa (and Why We Urgently Need to)? *SAJCD, 58*(2), 59-71. doi:10.4102/sajcd.v58i2.27

Kaufman, A. (2000). Foreword. In D. Flanagan, K. McGrew, & S. Ortiz, *The Wescler Intelligence Scales & Gf-Gc Theory: A Contemporary Approach To Interpretation.* (pp. 1-16). Needham Heights, MA: Allyn & BAcon.

Kaufman, A., & Kaufman, N. (2004). *Kaufman Assessment Battery for Children Manual* (2nd ed.). Bloomington, MN.: Pearsons Inc.

Kaufman, A., & Kaufman, N. (2014, February). Kaufman Assessment Battery for Children. *Encyclopedia of Special Education*. Retrieved June 24, 2015, from www.onlinelibrary.wiley.com

Kavita, K., Sharmilla, D., & Darshan, N. (2012). Environmental Factors Influencing Specific Learning Disabilities Among Children. *Indian Journals*, *2*(9). Retrieved September 5, 2012, from 6http://www.indianjournals.com/ijor.aspx?target=ijor:ziim&vol2

Kearney, E. (2010). Cultural Immersion in the Foreign Language Classroom, Some Narrative Possibilities. *Morden Language Journal, 94*(2), 332-336. doi:10.1111/j.1540-4781.2010.01028.x

Kelan, M., & Brennan, M. (2004). *Test Equating, Scalling and Linking.* New York: Springer Science and Business Media.

Kemp, C. (2009). Defining Multilingualism. In L. Aronin, & B. Hufeisan (Eds.), *The Exploration of Multilingualism: Development of Research On L3, Multilingualism and Multiple Language Acquisition* (Vol. 6, pp. 11-26). AILA. doi:10.1075/aals.6.02ch2

Klassen, R., Neufeld, P., & Munro, F. (2005). When IQ Is Irrelevant To The Definition Of Learning Disabilities: Australian School Psychologists' Beliefs And Practice. *School Psychology International, 26*(x), 1-20. Retrieved from www.se.amazonaws.com

Kleemans, T., Segers, E., & Verhoeven, L. (2011). Precursors to Numeracy in Kindergateners with Specific Language Impairment. *RES Dev Disabil.* (Nov-Dec). Retrieved 2017, from www.ncbi.nlm.nih.gov

Koch, E. (2007). The Monolingual Testing of Competence: Acceptable Practice or Unfair Exclusion. *Multilingualism and Exclusion: Policy Practice and Prospects*, 79-103. Retrieved from www.researchgate.net

Koch, E. (2009). The Case for Bilingual Language Tests: The Study of Test Adaptation and Analyses. *Southern African Linguistics and Applied Language Studies, 27*(3), 301-317.

Koch, E. (2015). Testing in Bilingual Education Projects: Lessons Learnt from the Additive Bilingual Education Project. *Per Linguam, 31*(2), 79-93. doi:10.5785/31-2-593

Kokot, S. (2006). The Nature and Incidence of Barriers to Learning Among Grade 3 Learners in Tswane Municipality. *Africa Education Review, 3*(1), 134-147.

Konza, D. (2011, June). *Phonological Awareness.* Retrieved from Research into Practice Website: www.ecu.edu.au

Koponen, T., Salmi, P., Eklund, K., & Aro, T. (2013). Counting and RAN: Predictors of Arithmetic Calculation and Reading Fluency. *International Journal of School and Educational Psychology.*

Kunene, X. (1999). *Developmental Profile of Speech (Consonantal Phonemes) Development in Zulu Speaking Children Between the Ages of Three to Five Years [Undergraduate/ Honours study]*. Durban: University of KwaZulu Natal.

Kunnan, A. (2014). Fairness and Justice in Language assessment. In A. Kunnan (Ed.), *The companion to Language Assessment* (pp. Chapter 66, pp1-17). Malden: John Wiley & sons. Retrieved from www.docswixstatic.com/ugd/1802b4_77348355bd224cfe

Kunnan, A. (2016). Large-Scale Language Assessments: Empirical Studies. In E. Hinkel (Ed.), *Handbook of Research on Second Language Learning.* Mawah, NJ: Routledge.

Kunnan, A., & Grabowski, K. (2013). Large Scale Language Assessment. In Kunnan. A. & Celce.-Murcia, M.(Ed.), *Testing English As A Second or Foreign Language* (pp. 304-319). New York: Heine/Cengage.

Laing, S., & Kamhi, A. (2003). Alternative Assessment of Language and Literacy in Culturally and Linguistically Diverse Populations. *Language-Speech and Hearing Services in Schools, 34*, 44-55.

Laird, D. (1985). *Approaches to training and Development.* Reading, MA.: Addison-Wesley. Retrieved from https://www.slideshare.net/sunnyaccord/learning-theories-11669951

Laney, M., & Edwards, J. (1999). Naming Errors of Children With Specific Language Problem. *Journal of Speech Language and Hearing Research, 42*, 195-205.

Lantolf, J., & Poehner, M. (2010). Dynamic Assessments In The Classroom: Vytgotskian Praxis for Second Language Development. *Language Teaching Research, 15*(1), 11-33.

Lathy, H. (2006). *An Assessment of Reading in First Language(L1) and Second Language (L2) Learners Who Experience Barriers to Learning. [Masters thesis]*. Johannesburg: University of Witwatersrand.

Le Roux, M., Geertsema, S., Jordaan, H., & Prinsloo, D. (2017). Phonemic Awareness of English Second Language Learners. *South African Journal of Communication Disorders, 64*(1), 1-9 (online). Retrieved from http://doi.org/10.4102/sajcd.v64il.l64

Leggo, S. (1992). *The Revision and Application of the Xhosa Test for the Auditory Comprehension of Language (XTACL).* Stellenbosch: University of Stellenbosch.

Leornard, L. (2014). *Children with Specific Language Impairment* (2nd ed.). London: MIT Press.

Leung, L. (2015). Validity, Reliability and Generalizability in Qualitative Research. *J. Fam Med Prim Care, 4*(3), 324-327. doi:10.4103/2249-4863.161306

Ley, P., & Florio, T. (1996,2007). The Use of Readability Formulas in Health Care. *Psychology, Health and Medicine, 1*(1), 7-28.

Lidz, C., & Pena, E. (2009). Response to Intervention and Dynamic Assessment: Do We Just Appear To Be Speaking the Same Language? *Seminars in Speech and Language, 30*, 121-133.

Lindsay, G., & Dockrell, J. (2002). Meeting the Needs of Children with Speech and Communication Needs: A Critical Perspective On Inclusion and Collaboration. *Child Language Teaching and Therapy, 18*(1), 91-101.

Lloyd, H., Paintin, K., & Bottin, N. (2006). Performance of Children with Different Types of Communication Impairment on the Clinical Evaluation of Language Fundamentals. *Child Language and Therapy Journal, 22*(1), 47-67.

Lombardino, L. (2012). *Assessing And Differentiating Reading & Writing Disorders: Multidimensional Model.* New York: Delmar Cengage Learning.

Lund, T. (2013). Kinds of Generalizations in Educational Research. *Scandanavian Journal of Educational Research, 57*(4), 445-456. Retrieved from www.tandfonline.com/doi/citedby/10.1080/00313831003764495

Luria, A. (1962). *Higher Cortical Functions in Man.* Moscow: Moscow University Press. Retrieved May, 17, 2015, from www.springerbooks.com

Luria, A. (1973). *The Cortical Functions of Man* (4th ed.). (Teuber. H. & Pribham. K. Eds.) New York: Springer Science and Business Media. Retrieved May 17, 2015, from https://books.google.co.za/books

Luria, A. R., & Haigh, B. (. (2012). *Higher Cortical Functions in Man.* (2nd ed.). (Haigh, Ed., & B. Haigh, Trans.) New York.: Basic Books Inc. Retrieved May 17, 2015, from http://link.springer.com

Mackey, S., & McQueen, J. (1998). Exploring the Association Between Integrated Therapy and Inclusive Education. *British Journal of Special Education, 22*(1), 22-27.

Magagula, S. (2009). *Standard versus Non-standard isiZulu: A Comparative Study Between Urban and Rural Learners Performance and Attitude [Masters Dessertation}.* Durban: University of KwaZulu Natal.

Maine, T. (2010). A Brief Overview of Language Education Problems Related to Linguistic and Cultural Diversity in South Africa. *Kalbu Studijos, 17*, 119-123.

Mann, E., McCartney, K., & Park, J. (2007). Preschool Predictors of the Need for early Remedial and Special Educational Services. *The Elementary School Journal, 107*(3), 273-285. Retrieved June, 15, 2015 from www.journals.uchicago.edu/doi/full/10.1086/511707

Massa, J., Gomes, H., Tartter, V., Wolfson, V., & Halperin, J. (2008). Concordance Rates Between Parent And Teacher CELF Observaton Rating Scale. *International Journal of lLnguage Communication Disorders, 43*(1), 99-110.

Mastropieri, M., Scruggs, M., & Graets, J. (2002). Reading comprehension Instruction for Secondary Students: challenges for struggling students and Teachers. *Learning Disabilities Quarterly*, 103-116.

Mathonsi, N. (1994). The Effect of a Multilingual Situation on Zulu Syntax and Semantics in the Greater Durban Area. *South African Journal of African Languages., 19*, 227-236.

Mayes, T., & de Freitas, S. (2004). Review of E-Learning Theories, Framework and Models. *JCIS E-Learning Focus*. Retrieved October 13, 2017, from www.elearning.ac.ukrelearningandpedagogyorpeddesignoremodels

Mayes, T., & de Freitas, S. (2007). *Rethinking Pedagogy for a Digital Age: Designing and Delivering E -learning* (1 ed.). (H. Beetham, & R. Sharpe, Eds.) London: Routledge.

Mazzocco, M., & Thompson, R. (2005). Kindergaten Predictors of Math Learning Disability. *Learning Disabilities Research and Practice, 20*(3), 142-155.

McCardle, P., Scarborough, H., & Catts, H. (2001). Predicting Explaining and Preventing Children's Reading Difficulties. *Learning Disabilities Research & practice, 16*(4), 230-239.

McClelland, M., Cameron, C., Connor, C., McDonald, T., Farris, C., Jewkes, A., & Morrison, F. (2007). Links Between Behavioural Regulation And Preschooler's Literacy, Vocabulary, And Math Skills. *Developmental Psychology, 43*(4), 947-959. Retrieved June 5, 2015 from people.oregonstate.edu/~mcclellm/ms/McClelland_etal_2007DP.pdf

McLeod, S. (2013). *Kolb-learning Styles*. Retrieved October 13, 2017, from Simply Psychology.org: www.simplypsychology.org/learning-kolb.html

Mdlalo, T. (2015). *The Use of An English Language Assessment Test On South African English Additional Language (EAL) Speakers From An Indigenuous Language And Cultural Background: A Critical Evaluation [Phd. Thesis]*. Durban: University of KwaZulu Natal. Retrieved Jan 12, 2016, from researchspace.ukzn.ac.za/handle/10413/6698/discover

Mdlalo, T., Flack, P., & Joubert, P. (2016). Are South African Speech -Language Therapists Equipped To Assess English Additional Language (EAL) Speakers From Indigenous Linguistic Background. A Profile and Exploration of The Current Situation. *South African Journal of Communication Disorders, 63*(1), 1-5. Retrieved January, 12, 2016, from www.sajcd.co.za

Meir, N., & Armon-Lotem, S. (2017, August). Independant And Combined Effects of Socio-Economic Status (SES) and Bilingualism on Children's Vocabulary and Verbal Short-Term Memory. *Frontiers in Psychology*, online 1-14. doi:10.3389/fpsyg.2017.01442

Mellard, D., Deshler, D., & Barth, A. (2004). LD Identification: Its Not Simply A Matter of Building A Better Mousetrap. *Learning Disabilities Quarterly, 27*(4), 229. Retrieved from files.eric.ed.gov/fulltext/EJ708321.

Micanovic`, V., Novovic`, T., & Maslovaric`, B. (2017, May). Inclusive Values In The Planning Of Mathematical Issues At An Early Age. *South african Journal of Education, 37*(2). doi:10.15700

Miller, I. (2006). Determining What Could/ Should Be: The Delphi Technique and Its Application. Columbus, Ohio: Mid-Western Educational Research Association. Retrieved March 04, 2017, from http:www.pareonline.net

Milligan, R. (2015). *A Comparison Of Working Memory Profiles In HIV-Infected And HIV-Exposed Uninfected Children [Doctorate Dessertation]*. Johannesburg: University of Witwatersraand.

Mitchell, J. (2015). *Psychometric Evaluation of the Kaufman Assessment Battery for Children, Second Edition (KABC II) in Rural South Africa [Masters Thesis]*. Stellenbosch: Stellenbosch University. Retrieved November, 5, 2017, from http://cholar.sun.ac.za.

Mmotlane, R., Winnaar, L., & Wa Kivilu, M. (2009). Personal Characteristics that Predict South Africans Participation in Activities of their Children's Schools. *South African Journal of Education., 24*(4).

Mncube, V. (2009). The Perceptions of Parents Of Their Role in The Democratic Gorvernance of Their Schools In South Africa: Are They On Board? *South African Journal of Education, 29*, 83-103.

Montague, M., & Cavandish, W. (2013, November 28). Implications of Proposed DSM-5 Changes For The Identification and Treatment of Students with LD and ADHD. *Journal of Learning Disabilities*.

Moodley, P., Kritzinger, A., & Vinck, B. (2016). Variables Associated With Grade R English Additional Language Acquisition in Multilingual Rural Mpumalanga Schools. *SAJE, 36*(3), 1-15.

Morrow, N., Jordaan, H., & Fridjhon, P. (2005). The Effects Of Educational Context on The Understanding of Linguistic Concepts In English And Isizulu By Grade 7 Learners. *South African Journal of Education, 25*(3), 164-169.

Mullis, I., Martin, M., Foy, P., & Arora, A. (2011). *TIMSS 2011 International Results in Mathematics.* Chestnut Hill, MA.: TIMSS & PIRLS International Study Centre. Retrieved October 25, 2017, from www.timms.bc.edu/timss2011

Murphy, M. (2007). *Enhancing Print Knowlege, Phonological Awareness and Oral Language Skills with At-Risk Children Preschool in Headstart Classes.* Nebraska: University of Nebraska. Retrieved from http://digitalcommons.unl.edu/desertations/aa13271904

Murray, C., & Wren, C. (2003). Cognitive, Academic and Attitudinal Predictors of The Grade Point Avarages of College Students With Learning Disabilities. *Journal of Learning Disabilities, 36*(5), 407-415. Retrieved January, 12, 2016 from journals.sagepub.com/doi/abs/10.1177/00222194030360050201

Muter, V., Hulme, C., Snowling, M., & Taylor, S. (1998). Segmantation Not Rhyming, Predicts Early Progress in Learning to Read. *Journal of Experimental Child Psychology, 71*(1), 3-27. doi:10.1006/jecp.1998.2453

National Center for Learning Disabilities. (2013). *Learning Disabilities: Understanding the 1 in 5.* Retrieved January , 12, 2016 from Language-based Learning Disability: ldnavigator.ncld.org/wp-content/uploads/2013

National Joint Committee on Learning Disabilities. (1994). *Technical Report :Issues on Learning Disabilities Assessment and Diagnosis.* American speech-Language Hearing Association. Retrieved from http:.www.asha.org/policy/tr1994-00140.htm

National Joint Committee on Learning Disabilities. (2007). *Learning Disabilities and Young Children: Identification and Intervention [Technical Report]*. American Speech-Language Hearing Association. Retrieved June 5, 2015, from http:www.asha.org/policy

Naude', E., Louwe, B., & Weideman, A. (2007). *Southern African Linguistics and Applied Language Studies*(25(4)), 519_538.

Navsaria, I., Pascoe, M., & Kathard, H. (2011). "Its Not Just The Learner, It's The System!" Teachers' Perspectives on Written Language Difficulties:Implications for Speech - Language therapy. *SAJCD*, 95-104.

Nel, M., & Grosser, M. (2016). An Appreciation Of Learning Disabilities in the South African Context. *Learning disabilities: A Contemporary Journal*, 79-92. Retrieved 3 10, 2018, from https://www.researchgate.net/publication/301347821_An_Appreciation_of_Learning_Disabilities_in_the_South_African_Context

Nell, V. (1999). Standardising the WAISS-III and the WMS III for South Africa: legislative, Psychometric and Policy Issues. *South African journal of Psychology*, *29*(3), 128-137.

Nelson, N. (2006). Written Language Assessment & Intervetion: Session Overview. *American Speech and Hearing Association Annual Conference* (p. 3). Miami: ASHA.

Nelson, N., Roth, F., Scott, C., Meter, A. V., & Troia, G. (2006). Written Language Assessment & Intervention: It Targets More Than Writing. Miami, FL: American Speech and Hearing Association.

Ngulube, R., & Ngulube, B. (2015). Mixed Method Research And The South African Journal of Economic And Management Sciences: An Investigation of Trends in The Literature. *South African Journal Of Economic And Management Sciences, 8*(1).

Ni Shè, C., Breen, S., Brennan, C., Doheny, F., Lawless, F., MacanBhaird, C., Nolan, B. (2015). Identifying Problematic Mathematical Topics and Concepts for First Year Students. *CETL-MSOR Conference 2015-Sustaining Excellence* (pp. 74-83). London: Researchgate. Retrieved from www.researchgate.net

Nyembezi, s. (1992). *Isichazamazwi Sanamuhla Nangomuso.* Pietermaritzburg: Reach Out Publishers.

Oakland, T., & Lane, H. (2004). Language, Reading & Readability for Formulas: Implications For Development And Adapting Tests. *International Journal of Testing, 1*.

O'Connor, J., & Geiger, M. (2009). Challenges Facing Primary Schools Educators of English Second(or other) Language Learners in the Western Cape. *SAJE 2009, 29*, 253-269. Retrieved November 22, 2017, from www.scielo.org.za/...script=sci_arttext&pid=S0256-01002009000200007

Oyebade, S. (2001). Applying The General Systems Theory To Students Conflict Management In Nigeria's Tertiary Institutions. *Lagos Journal of Educational Administration And Planning*, 39-49. Retrieved from www.ahero.uwc.ac.za

Pahl, J., & Kara, M. (1992). The Renfrew Word Finding Scale: Application to the South African Context. *SAJCD*, 69-73.

Pakerndorf, C., & Alant, E. (1997). Culturally Valid Assessment Tools: Northern Sotho Translation of the Peabody Picture Vocabulary Test-Revised. *South African Journal of Communication Disorders, 44*, 3-12. Retrieved from ncbi.nlm.nih.gov

Paradis, J., Schneider, P., & Duncan, T. (2013). Discriminating Children with Language Impairment among English Language Learners from Diverse First Language Backgrounds. *Journal of Speech, Language and Hearing Research, 000*, Online version 1-11. Retrieved from jslhr.pubs.asha.org/article.aspx?articleid=1797039

Paris, S. (2005). Reinterpreting The Development of Reading Skills. *Reading Research Quarterly, 40*(2), 184-202. doi:10.1598/RRQ.40.2.3

Parsot, S. (2012). *The Methods of Assessment Used by Speech-Language Therapists for Learners with Multiple Disabilities in Schools in Gauteng {Masters Thesis}.* Johannesburg: University of Witwatersrand.

Pica, T. (2005). *Second Language acquisition Research and Applied Linguistics.* University of Pennsylvania, Graduate School of Education. Philadelphia: University of Pennsylvania. Retrieved Nov 3, 2017, from repository.upenn.edu/cgi/viewcontent.cgi?article=1033&context=gse_pubs

Pillay, J. (2017). The Relationship Between Housing and Children's Literacy Achievements: Implications For Supporting Vulnerable Children. *South African Journal of Education, 37*(2).

Poulos, G., & Msimang, C. T. (1998). *A Linguistic Analysis of Zulu* . Cape Town: Via Afrika.

Pretorius, S., Hansen, Z., Smit, M., Jourbet, T., Mostert, T., & Adinolfi, E. (2009). The Use of Existing Measures to Test the Cognitive Functioning of Children within the South African context. *New voices in psychology, 5*(2), 51-63.

Project for the Study of Alternative Education in South Africa. (2017). Issues in the Development of Multilingual Children's Literacy and Literature in South Africa-Taking stock. Cape Town: PRAESA. Retrieved November 27, 2017, from www.praesa.org.za>publications>conference papersa and presentations

Raborn, D. (1995). Mathematics for students with Learning Disabilities From Language Minority Backgrounds: Recommendations for Teaching. *New York State Association for Bilingual Education Journal, 10*, 25-33. Retrieved June, 15, 2016 from idonline.orgarticleor130770r

Renfrew, C. E. (1989). Word Finding Vocabulary Scale. Biscester, Oxon: Winslow Press.

Rice, M. A. (1996). Towards Tense of as a Clinical Marker of Specific Language Impairment in English- Speaking Children. *Journal of Speech, Language and Theory research, 39*, 1239-1257.

Richter, R. (2013). *Language Therapy and Academic Achievement in Mathematics: Speech-Language Therapist' Roles and Perspectives.* Eastern Michigan University. Michigan: Digital Commons @ EMU. Retrieved from wwwcommons.emich.edu/cgi.viewcontent.cgi?

Rijhumal, M. (2011). *SLI or "Slow to Develop English Additional Language (EAL) Learners-How Do We Know? [Masters Thesis]*. Johannesburg: University of Witwatersrand.

Rispens, J., & Baker, A. (2012). Nonword Repetitions: The Relative Contributions of Phonological Short Term Memory And Phonological Representations In Children With Language and Reading Impairments. *Journal of Speech, Language amd Hearing Research, 55*(3), 683-694.

Roberts, B., wa Kivilu, M., & Davids, Y. (2010). Introduction: Reflections on the Age of Hope. In B. w. Roberts, & Y. Davids. *South African Social Atttitudes: 2nd Report: Reflections on the Age of Hope* (pp. 1-16). Cape Town: HSRC Press. Retrieved from www.hsrcs>South African Social Attitudes Survey

Robertson, C., & Salter, W. (1997). The Phonological Awareness Test. East Moline, IL: Linguisystems, Inc.

Rochat, T., Mitchel, C., & Richter, L. (2008). The Psychological, Social And Developmental Needs Of Babies And Young Children and Their Caregivers Living with HIV and AIDS. *HSRC Publications*.

Roseberry-McKibbin, C. (2008). *Multilingual Students with Special Language Needs* (3rd ed.). (Roseburry-McKibbin,C. Ed.) Boston, MA.: Pearson education.

Roseberry-McKibbin, C., & Brice, A. (1996). *Acquiring English as a Second Language.* Retrieved 2 20, 2014, from American Speech Hearing Association: http://www.asha.org..development

Rossetti, L. (2006). *The Rossetti Infant-Toddler Language Scale.* East Moline, IL: Linguisystems, Inc.

Roush, J., & Mundy, M. (2012). Hearing screening for the Speech-Language Pathologist. *ASHA Annual National Convention.* Atlanta: ASHA. Retrieved May 12, 2015, from www.asha.org

Royal College of Speech and Language Therapists. (2007). *Special Interest Group (SIG) Bilingualism, Good practice for Speech and language Therapists Working with Clients from Linguistic Minority Communities (London).* Retrieved 2017, from Definition of Bilingualism: www.rcslt.org/members/publications/publications2/linguistic minorities

Rudwick, S. (2008). "Coconuts" and "Oreos": English-speaking Zulu People in a South African Township. *World Englishes, 27*(1), 101-116. Retrieved from http://s3.amazonaws.com

Rvachew, S. (2006). Longitudinal Predictors Of Implicit Phonological Awareness Skills. *American Journal of Speech-Language Pathology, 15*, 165-176.

Rvaschew, S. (2007). Phonological Processing and Reading In Children With Speech Sound System Disorders. *American Journal Speech- Language Pathology*. Retrieved July 15, 2016, from ajslp.pubs.asha.org/article.aspx?articleid=1766666

Salameh, E., Hakansson, G., & Nettelbladt, U. (2004). Developmental Perspectives On Bilingual Swedish-Arabic Children With and Without Language Impairment: A Longitudional Study. *International Journal Of Language & Communication Disorders, 39*(1), 65-90. Retrieved July 14, 2016, from http://onlinelibrary.wiley.com

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business students* (5 ed.). Harlow: Pearson Education Limited. Retrieved March 4, 2014, from www.eclass.teicrete.gr

Saville-Troike, M. (2006). *Introducing Second Language Acquisition.* New York: Cambridge University Press. Retrieved March, 2, 2015, from elt502ciu.wikispaces.com

Scanlon, D. (2013). Specific Learning Disabilities And Its Newest Definition: Which Is Comprehensive And Which Is Insufficient? *Journal of learning Disabilities, 46*(1), 26-33. Retrieved February 4, 2014, from http:www./lax.sagepub.com/content/46/1/26

Schaap, P. (2011). Differential Item Functioning And Structural Equivalence Of A Non-Verbal Cognitive Test For 5 Language Groups. *South African Journal Of Industrial Psychology, 37*(2), 881.

Schindler, & Cooper. (2011). *Business Research Methods* (11 ed.). Boston: Irwin McGraw Hill.

Schmitt, M. L. (2017). Establishing language Benchmarks for Children with Typically Developing Language and Children with Language Impairment. *Journal of speech Language and Hearing Research, 60* (1), 364-386.

Schneider, J., & McGrew, K. (2012). The Cattell-Horn-carroll model of intelligence. In D. Flanagan, & P. Harrison, *Contemporary Intellectual Assessment:Theories, Tests and Issues* (pp. 99-144). New York: Guildford Press.

Schulze, S., & van Heerden, M. (2015). Learning Environments Matter: Identifying Influences on the Motivation to Learn Science. *South African Journal of Education, 35*(2), online. Retrieved August 8, 2017, from www.sajournalofeducation.co.za/index.php/saje/article/viewArticle/1058

Schulze, S., & Van Heerden, M. (2015). Learning Environments Matter: Identifying Influences on the Motivation to Learn Science. *South African Journal of Education, 35*(2), 1-9 (online). doi:10.15700.saje.v35n2.1058

Schunk, D. (2012). *Learning Theories:An Educational Perspective* (6th ed.). Boston: Pearson Education Inc. Retrieved May 20, 2017, from http:www.sajadstudio.info

Scruggs, T. E., & Mastropieri, M. A. (2002). On Babies and Bathwater: Addressing the Problems of Identification of Learning Disabilities. *Learning Disability Quarterly*. Retrieved from www.advocacyinstitute.org/resources/Babies_and_Bathwater

Segalowitz, S., & Gruber, F. (2014). *Language Development and Neurological Theory.* London: Academic Press Inc. Retrieved May, 20, 2017, from EBook from www.bokus.comorlanguage-development-and-neurological-theory.

Shaik, N. (2016). Teacher's Beliefs About Child Participation In Grade R. *South African Journal Of Childhood Education, 6*(1).

Shonkoff, J., & Phillips, D. A. (2000). From Neurons To Neighborhoods: The Science Of Early Childhood Development. *Communicating And Learning*, 124-162.

Sideridis, G. (2007). International Approaches to Learning Disabilities: More Alike or More Different? *Learning Disabilities Research & Practice, 22*(3), 210-215. Retrieved from onlinelibrary.wiley.com/doi/10.1111/j.1540-5826.2007.00249.x/abstract

Sideridis, G., Morgan, P., Botsas, G., & Padeliau, S. &. (2006). Prediction Of Students With LD Based on Metacognition, Motivation, Emotions and Pyschopathology: A ROC analysis. *Journal of Learning disabilities*, 215-229.

Siegel, L., Share, D., & Geva, E. (2000). Evidence of Superior Orthographic Skills in Dyslexics. *Psychological Science, 6*(4), 250-254. Retrieved May 5, 2017, from www.journals. sagepub.com

Sievertsen, H., & Gino, F. P. (2016). Cognitive Fatigue Influences Students' Performance On Standardised Tests. *PNSA, 113*(10), 2621-2624. Retrieved May 20, 2017, from pnas.org/content/113/10/2621

Silliman, E., Butler, K., & Wallach, G. (2001). The Time Has Come To Talk Of Many Things. In E. Butler, & K. Silliman (Eds.), *Speaking, Reading and Writing In Children With Language Learning Disabilities: New Paradigms In Research And Practice.* Mahwah NJ: L Erlbaum Associates.

Silvia, P., Winterstein, B., Willse, J., Barona, C., Cram, J., Hess, K., Richard, C. (2008). Assessing Creativity With Divergent Thinking Tasks: Exploring The Reliability and Validity Of New Subjective Scoring Methods. *Psychology of Aesthatics, Creativity and the Erts, 2*(2), 68-85.

Singh, P., & Rampesad, R. (2010, June 23). Communication Challenges in a Multicultural Learning Environment. *Journal of Intercultural Communication, 23*. Retrieved June 13, 2014, from http//www.mmi.se/intercultural/.

Sireci, S., & Khaliq, S. (2002). An Analysis Of The Psychometric Properties of Dual Language Test Forms. New Orleans: National Council on Measurement in Education.

Sireci, S., Han, k., & Wells, C. (2008). Methods for Evaluating the Test Scores for English Language Learners. *Educational Assessments, 13*(October), 108-131.

Sky, M., Taylor, M., O'Carrol, S., Fidhon, P., & Rosenthal, L. (2000). Performance of Black and White South African Children on The Weschler Intelligence Scale for Children-Revised and the Kaufman Assessment Battery. *Pyschology Report, 86*, 727-737.

Smit, N., Trainor, L., Gray, K., Planting, J., & Shore, D. (2008). Stimulus Task and Learning Effects on Measures of Temporal Resolution: Implications For Predictors of Language Outcome. *Journal of Speech, Language and Hearing Research, 51*, 1630-1642. Retrieved from jslhr.pubs.asha.org/article.aspx?articleid=1775144

Sneider, M., & Cooper, J. (2007). *Testing A Disability Schedule For Census 2011: Summary Report on 26 Focus Groups.* Pretoria: Human Science Research Council.

Snowling, M., Bishop, D., & Stothard, S. (2000). Is Pre-School Language Impairment At Risk Factor For Dyslexia In Adolescence? *Journal of Children's psychology and Psychiatry, 41*, 587-600.

Solarsh, B., & Alant, E. (2005). The Challenge Of Cultural Assessments-The Test of Ability to Explain for Zulu-Speaking Children. *Journal of communication disorders, 39*(2), 109-138.

Stagg-Peterson, S. (2014, February). Supporting Struggling Writers. *What works: Research into Practice*(Research Monograph #49), 1-4. Retrieved from www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/whatWorks.html

Stanovich, K. (2005). The Future Of A Mistake: Will Discrepency Measurement Continue To Make the Learning Disabilities Field A Pseudoscience. *Learning Disabilities Quarterly, 28*(2), 103-106. Retrieved February 4, 2014

Statistics South Africa. (2011b). *General Household Survey 2011: Focus on Schooling.* Pretoria: STATSSA. Retrieved February, 13, 2015 from www.statssa.gov.za/publications/P03014/P030142011.pdf

Statistics South Africa. (September 2014). *Profiles of Persons with Disability.* Pretoria: Statistics South Africa. Retrieved December 2, 2014, from www.statssa.gov.za/?p=3180

Sternberg, R. (2009). An Introduction To The Theory of Successful Intelligence. In J. K. Grigorenko (Ed.), *The Essential Sternberg Essays on Intelligence, Psychology and Education* (pp. 3-32). New York: Springer Publishing Company. Retrieved June 13, 2017, from ighttp.48653.nexcesscdn.net

Stow, C., & Pert, S. (2015). *SLT Assessment and Intervention: Best Practice For Children and Young People In Bilingual Settings.* Retrieved November 18, 2017, from www.rcslt.org/members/publications/publications2/bilingualism

Straub, D., Loch, K., Evaristo, R., Karahama, E., & Srite, M. (2003). Towards a Theory-Based Measuremet of Culture. *Journal of Global Information Management, 10* (1), 14-23. Retrieved from https://www.igi-global.com/article/toward-theory-based-measurement-culture/3563

Sullivan, M., Popp, J., & Raphael, T. (2011, July). Interdisciplinary Perspectives on Learning to Read: Culture, Cognition, and Pedagogy (Routledge Psychology in Education). (G. H. Hall, Ed.) *Literacy, 45*(2), 98. Retrieved from http://www.onlinelibrary.wiley.com

Sun, L., & Wollach, G. (2014, Jan-March). Language Disoders Are Learning Disabilities. *Topics in Language Disorders, 34*(1), 25-38. Retrieved from www.decodingdyslexia.org>2015/09>llan

Suzman, S. (1996). Acquisition of the Noun Class Systems in Related Bantu Languages. In C. Johnson, & J. Gilbert (Eds.), *Children's Language* (Vol. 9, pp. 87-104). Mahweh,NJ.: Lawrence Elbraum.

Swanson, H. (1991, November). Operational Definitions and Learning Disabilities: An Overview. *Learning Disabilities Quarlterly* (1), 232. Retrieved April 4, 2013, from www.journals.sagepub.com

Swanson, H. (2004, June). Working memory and phonological processing as predictors of children's mathematical problem solving at different ages. *Mem Cognit, 32*(4), 648-661. Retrieved May 02, 2017, from www.ncbi.nim.nih.gov

Swanson, H., & Alexander, J. (1997). Cognitive Processes As Predictors of Word Recognition and Reading Comprehension In Learning Disabilities and Skilled Reader: Revisiting the Specificity Hypothesis. *Journal of Educational Psychology, 89*(1), 128-158.

Taderera, C. & Hall, H. (2017). Challenges Faced By Parents of Children With Learning Disabilities in Opuwo, Namibia. *African Journal of Disability 6 (2017).* Retrieved March 16, , 2018, from https://doi.org/10.4102/ajod.v6i0.283

Taylor, S., & VonFlintel, M. (2016). Estimating The Impact of Language of Instruction In South African Primary Schools: A Fixed Effects Approach. *Economics of Education Review,* 75-89.

Teddlie, C., & Tashakkori, A. (2012). Common Core Characteristics of Mixed Methods Research: Review of Critical Issues And Call For Greater Convergence. *American Behavioural Scientist, 56*(6), 774-788.

Teddlie, C., & Yu, F. (2007). Mixed Methods Sampling: A Typology With Examples. *Journal of mixed Methods Research, 1*(1).

Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., & Rios, L. (2010). A Tutorial on Pilot Studies: the what, why and how? *BMC Medical Research Methodolgy, 10*(1), Online. Retrieved November 22, 2017 from https..//bmsmedresforesmethodol.biomedcentral.com/articles/10.1186/1471

The National Reading Panel. (2000). *Report On The National Reading Panel: Teaching Children To Read: An Evidence-Based Assessment Of The Scientific Research Literature On Reading And Its Implications For Reading Instruction*. Washington D.C.: National Institute of Child Health and Human Development. Retrieved August 18, 2017, from www.nivhd.nih.gov>pubs_details

Thompson, S., Johnstone, C., & Thurlow, M. (2002). *Universal Design Applied To Large Scale Assessments. Synthesis Report NCEO44.* Minealpolis,MN: National Center on Educational Outcomes. Retrieved from files.eric.ed.gov/fulltext/ED467721

Thornton, B., Peltier, G., & Perreault, G. (2004, May June). Systems Thinking: A Skill To Improve Student Achievement. *Clearing House, 77*(5), 222-. Retrieved from www.donnaelder.wiki.westga.edu

Thygesen, R. (2007). Students With Learning Disabilities: An Update On Norwergian Educational Policy, Practice and Research. *Learning Disabilities Research and Practice, 22*(3), 176-182.

Torres-Velasquez, D., & Rodriguez, D. (2005). *Improving Mathematics Problem Solving Skills for English Language Learners With Learning Disabilties.* Retrieved from Colorin Colorado!: colorincolorado.org/article/improving-mathematics-problem-solving-skills-english-learners-learning-disabilities

Tranter, D., & Kerr, D. (2016). *Understanding Self Regulation: Why Stressed Students Struggle To Learn (Research Monograph No.63).* Ontario: Literacy and Numeracy Secretariat and the Ontario Association of Deans of Education.

Trochim, M. (2006, 10 20). *Social Research Methods.* Retrieved 08 08, 2017, from www.socialresearchmethods.net

Trudell, B., & Schroeder, L. (2006). *Reading Methodologies for African Languages: Avoiding Linguistic and Pedagogical Imperialism.* Taylor & Francis. Retrieved December 2017, 2, from www.scholar.google.co.za

Tunmer, W.E. & Chapman, J.W. (2012). The Simple View of Reading Redux: Vocabulary Knowledge and The Independent Components Hypothesis. *Journal of Learning Disabilities. Sep-Oct.*

Turuk, M. (2008). The Relevence and Implications of Vygotsky's Socio-cultural Theory in the Second Language Classroom. *Arecls, 5*, 244-262.

Tzeng, S. (2007). Learning Disabilities In Taiwan: A Case Of Cultural Constraints On The Education of Students With Disabilities. *Learning Disabilities Research and Practice, 22*(3), 170-175.

United States Office of Education. (1977). *Definition and Criteria for Defining Students as Learning Disabled.* Office of Education. Washington D.C.: U.S Government Printing. Retrieved september 16, 2015

Uys, M., van der Walt, J., van der Berg, R., & Botha, S. (2007). English Medium of Instruction: A Situation Analysis. *South African Journal of Education, 27*, 69-82.

Van Dulm, O. & Southwood, F. (2013). Child Language Assessment and Intervention in Multilingual and Multicultural South Africa: Findings of A National Survey. *Stellenbosch Papers in Linguistics, 42*, 55-76.

Van Kraayenoord, C., & Goos, M. (2003). Metacognition. In P. Keeves, & W. R, *International Handbook of Educational research in the Asia-Pacific Region* (pp. 477-494). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Van Staden, S., Bosker, R., & Bergbauer, A. (2015). Differences In Achievement Between Home Language and Language of Learning In South Africa: Evidence from prePIRLS2011. *South African Journal of Childhood Education, 6*(1).

Veii, K., & Everatt, M. (2005). Predictors Of Reading Among Herero-English Bilingual Namibian School Children. *Bilingualism: Language and Cognition*, 239-254. doi:http://dx.doi.org/10.11017/S1366728905002282

Vissers, C., & Koolen, S. (2016). Theory Of Mind Deficits and Social Emotional Functioning In Preschoolers With Specific Language Impairment. *Frontiers in Psychology, 7*(1734), 1-7 (online). doi:10.3389/fpsych.2016.011734

Vorster, J. (1980). *Toest Vir Mondelinge Taalproduksie [Test For Oral Language Production]*. Pretoria: South African Institute For Pychological And Psychometric Research.

Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychology Processes.* (J.-S. S. Cole, Ed.) New York: Harvard University Press.

Wa Kivilu, M., Diko, R., & Mmotlane, R. (2010). South African's Attitudes to Social integration in Public Schools. In B. Roberts, M. wa Kivilu, & Y. Davids, *SA's attitudes: The Second Report Reflections On Age Of Hope* (Chapter 7). Pretoria: HSRC press.

Wallis, T., & Birt, M. (2003). A Comparison Of Native and Non -Native English Speaking Groups Understanding of The Vocabulary Contained Within The 16PF (SA92). *South African Journal of Psychology, 33*(3), 182-190.

Walsh, M. (2010, October). Multimodal Literacy: What Does It Mean For Classroom Practice? *Australian Journal of Language and Literacy, 33*, 211-239.

Walsh, R. (2009). The Big Picture of Literacy. *ACQuiring Knowledge in Speech Language Hearing, 11*(2), 67-71.

Warner, C. W.-N. (2004). *Assessment of Communication, Language And Speech: Questions Of What To Do Next?* (Bracken. B.A., Ed.) New Jersey: Elbraum Associates Inc.

Watkins, S.; SKI-HI Institute Utah State University. (2004). *The SKI-HI laanguage development scale (LDS): assessment of language skills for children who are deaf or hard of hearing from infancy to five years of age.* North Logan: Hope Inc.

Weinrich, B., & Fay, E. (2007). Phonological Awareness/ Literacy Predictors of Spelling Abilities for First Grade Children. *Contemporary Issues in Communication Science and Dissorders, 34*, 94-100.

Wekesa, W., Poipoi, M., Wanyama, R., & Nyakwara, B. (2012). Early identification of Learning disabilities Among Grade 3 Pupils of Primary Schools in Butere District Kenya. *Journal of Emerging Trends in Educational Research & Policy Studies*, 389-394.

Wells, G. (1994). The complimentary Contributions of Halliday and Vygotsky to a "Language- Based Theory of Learning". *Linguistics And Education, 6*, 41-90. Retrieved from http://www.lchc.ucsd.edu

Westerveld, M. (2011). Sampling and Analysis of Children's Spontaneous Language. *ACQ, 13*(2), 63-67. Retrieved from www.speechpathologyaustralia.org.au

White, C., & Jin, L. L. (2011). Evaluation of Speech And Language Assessment Approaches With Bilingual Children. *Int J Lang Comm Disord, 6*(Nov-Dec), 613-627.

Whiting, P., Rutjies, A., Riesma, J., Bossuyt, P., & Kleijnen, J. (2003). The Development of QUADAS: A Tool For The Quality Assessment Of Studies Of Diagnostic Accuracy Included in Systematic Reviews. *BMC Biomedical Research Methodology, 3*(25), 25. Retrieved from http:www.biomedcentral.com/1471-2288/3/25

Wiig, E., Secord, W., & Semel, E. (2004). CELF 4: Clinical Evaluation of Language Fundamentals. *2nd*. Bloomington, MN: Pearson Inc. Retrieved Jan 17, 2014

Wiig, E., Secord, W., & Semel, E. (2004). CELF Preschool 2: Clinical Evaluation of Language Fundamentals Preschool. Bloomington, MN.: Pearson/PsychCorp.

Wilsenach, C. (2013). Phonological Skills As Predictor Of Reading Success: An investigation of Emerent Bilingual Northern Sotho/ English Learners. *Per Linguam, 29*(2), 17-32. Retrieved 5 2016, from http://www.uir.unisa.ac.za

Wilsenach, C. (2015, March 6). Receptive Vocabulary and Early Literacy Skills In Emergent Bilingual Northern Sotho-English Children. *Reading and Writing-Journal of the Reading Association of Southern Africa, 6*(1), 1-15.

Wilsenach, C. (2016). Identifying Phonological Processing Deficits In Northern Sotho-Speaking Children: The Use of Non-Word Repition As A Language Assessment Tool

In the South African Context. *South African Journal of Communication Disorders, 63*. doi:htt://dx.doi. org/10.4102/sajcd

Wilson, S., & Peterson, P. (2006). *Theories of Learning and Teaching: What Do They Mean For Teachers.* Washington DC.: National Education Association. Retrieved November 3, 2017, from files.eric.ed.gov/fulltext/ED495823.pdf

Wiseheart, R. (2013). The Curious Case Of Digits: New Findings On The Reading-RAN-Math Connection. *ASHA Annual National Convention.* Chicago: ASHA. Retrieved June 12, 2015, from www.asha.org>1366-Wiseheart

Yao, B., & Wu, H. (2003, December). Risk Factors of Learning Disabilities in Chinese Children in Wuhan. *Biomed Environ Sci., 16*(4), 392-397. Retrieved April 18, 2017, from http://www. ncbi.nlm.nih.gov

Yao, B., & Wu, H. (2003). *The Neuropsychology of Asian-Americans.* (Fujii, D., Ed.) New York: Taylor & Francis. Retrieved February 12, 2017, from http:www.books.google.co.za

Ziervogel, D., Louw, J., & Ngidi, J. (1967). *A Handbook of The Zulu Language.* Pretoria: Van Schaik.

Zuma, E., & Dempster, S. (2008). IsiZulu as a Language of Assessment in Science. *Africa Journal of Research in SMT Education, 12*(2), 31-46.

APPENDICES

APPENDIX A. BBL-BLD Construct Definitions

Tool Constructs and subtests	**Definitions**	**Skills Required**
Listening Skills	The learner's ability to follow verbal instructions with understanding of basic concepts such as number systems, before/ after, shapes and patterns, colours, directions and positions	Comprehension; receptive language; short term memory; auditory temporal processing and rhythmic sensory processing.
Following Auditory Directions	The ability to hear and understand the information that is heard through the ear and use it to follow instructions	Listening ability, auditory memory, auditory cohesion.
Language	Complex and dynamic system of conventional symbols (American Speech Language Hearing Association, 1982)	Expressive, receptive, written ,
Story Comprehension	The ability to understand a verbal story and answer direct and indirect questions relating to it.	General verbal communication ability, second language proficiency and meta-linguistics.
Word Association and Reasoning	The ability to group the words appropriately into their categories. The ability to justify the choices also showing comprehension of the words and their categories.	Articulation accuracy; language vocabulary size and knowledge, associative memory, associational fluency, reasoning and problem solving
Reading	The ability to use the basic knowledge about letters and sounds to produce printed words.	Alphabet knowledge, phonemic awareness, oral reading fluency.
Spelling	The ability to use the knowledge of letters and sounds as well as the rules that govern the combination of the letters in order to write words.	Knowledge of letters and sounds, Phonemic awareness, decoding.
Phonological Awareness	The awareness of the sound structure of spoken words.	Phonemic awareness; Short term memory; rhythm and prosody or phonetic coding, sound discrimination, spelling ability.
Letters In Words	The ability to fill in the missing letter.	Reading fluency, comprehension, Spelling skills.
Rapid Automated	The ability to repeat or label a sequence of pictures or words	Language processing speed.

Naming	as fast as possible.	
Reading And Doing	The ability to read with understanding and follow written instructions.	Word recognition; reading decoding, reading speed, Working memory; semantic and Meta cognitive skills.
Sequential Memory	A subset of working memory that involves serial recall tasks. The ability to remember information heard and recall it in the correct sequence it was heard.	Sequential memory of digits, letters and single words.
Working Memory	Reflects the ability to apply to memory representations that are currently active to either bring them to focus; maintain them in focus or dampen them to focus (Engle, Tu Holski, Laughlin and Conway (1999:312)	Attention, short term memory.
Repeating Digits	The ability to immediately recall a span of digits.	Articulatory memory
Repeating Letters and Remembering Colours	The ability to immediately recall a sequence of random letter sounds and a word colour but later recall only the colour word mentioned	Phonological store, articulatory rehearsal, phonological memory
Repeating Words backwards	The ability to immediately recall span for word sequences	Short term memory or retaining of information for a short time
Repeating Combined Sequences Backwards	The ability to immediately recall, in backward sequence, a set of digits or words or letter.	Working memory, controlled attention.
Numeracy Based Language Concepts	Language skills that facilitate understanding and expression of numerical information	Vocabulary relating to concepts of numbers, quantity, positions, measurements, size, functions and problem solving.
Numerical Vocabulary	An ability to know and hold a repository of words relevant concepts required for numeracy. The term numeracy is adopted from the DBE definition which states that numeracy is the ability to reason with numbers and mathematical concepts such as addition and subtraction (DBE, 2014:11).	Associative memory; working memory; rapid automatized naming.
Problem Solving	The ability to think and process problems in forwards and backwards sequences in verbal numeracy tasks	Spatial reasoning, problem solving, math knowledge and numeric processing skills.
Word Sums	The ability to understand concepts, solve problems and perform calculations in written numeracy tasks expressed in words.	Associative memory; working memory; rapid automatized naming, Spatial reasoning, problem solving, math knowledge and numeric processing skills.

Behaviour Assessment	The assessment of the learners' participation looking at factors that could have a negative impact on their results e.g. concentration, attention, mood, speech and language.	Attention, Pragmatic skills.

APPENDIX B. BBL-BLD Tool Constructs

Subtest	Construct	Purpose of the Test	Language of Testing	Matching cognitive abilities
Section A: Listening Skills	**A1 Following auditory directions (English)** • 10x directions • 10 x sets of pictures **A2 Following auditory directions (isiZulu)** • 10x directions • 10x sets of pictures	To evaluate the learner's ability to follow instructions in English and in isiZulu. To evaluate and compare understanding of some basic concepts such as number systems, before or after, shapes, patterns, colours, directions and positions.	Bilingual English and IsiZulu	Broad: Fluid reasoning; Comprehension Knowledge. Narrow: Induction, general sequential reasoning; Listening ability, General verbal information; Lexical knowledge and grammar
Section B: Language Skills	**B1 Story comprehension** • Bilingual assessment • 12 items ; graded • No Pictures **B 2 Word association and reasoning** • 20 items • IsiZulu or English assessment • Not graded	To evaluate the learner's ability to understand the story in English and compare to his/her performance in isiZulu. By asking the questions in isiZulu the emphasis is on the learner's ability to understand the questions thereby demonstrating their true comprehension of the story. To evaluate the learner's vocabulary and the ability to associate the words appropriately into their categories. The ability to justify the choices demonstrates reasoning and comprehension of the words and their categories.	Bilingual English and isiZulu	Broad: Comprehension Knowledge; Long term storage and retrieval Narrow: Lexical knowledge and Grammar, Associative memory; associational fluency, word fluency.

Section C: Reading and Spelling Skills	**C1 Phonological awareness** • 35 items • Pseudo-words • Not graded **C2 Sound-Letter awareness** **4** English or isiZulu assessment **5** 5 items **6** graded **C3 Rapid automated naming** • 3 items • Not graded • Time recording **C4 Reading and doing** • Assess in English / isiZulu • 5 items • Graded • Time recording	To assess phonological awareness using pseudo-words, application of letter awareness, decoding skills, analysis and synthesis for application in both isiZulu and in English. In this section the test items are pseudo-words words which can be pronounced with an IsiZulu or an English accent depending on the learner's language of instruction and the purpose of assessment. To assess the learner's ability to identify and fill in the missing letter in a word. To assess the learner's ability to rapidly name letters, pictures and read pseudo-words. To assess the learner's ability to read and follow written instructions.	Pseudo-words C2: Preferred language English OR isiZulu C3 and C4: Preferred language English OR isiZulu	Broad: Reading and writing, processing speed; Auditory processing. Narrow abilities: Decoding, comprehension, speed, spelling ability; memory of sound patterns, phonetic coding, speech sound discrimination.
Section D: Working Memory	**D1. Repeating digits** **D2. Repeating letters and remembering colours** **D3. Repeating words**	To assess working memory capacity that reflects applied memory to tasks that are currently active. To assess the ability to bring information to focus or maintain it in focus in the midst of distraction.	Bilingual English and IsiZulu	Broad: Short term memory; Long term storage and retrieval Narrow: Memory span, working

	backwards **D4. Memory Capacity** • 6 items per subtest • Incremental progression			memory; associative memory.
Section E Mathematic Concepts	**E1 Numeric vocabulary** • 10 items • Test in English or isiZulu • Pictures **E2 problem solving** • 10 items • Test in English or isiZulu **E3 word sums** • 10 items • Test in English or isiZulu	To assess the learner's vocabulary relevant for numeracy. To assess knowledge of words and concepts that are necessary for comparisons, measurements, contrasting and calculations**.** To evaluate the learner's ability to use logic, reasoning and communication in order to solve problems in the absence of mathematical symbols and signs. To evaluate the learner's ability to apply abstract mathematical concepts to real life situations, demonstrating skill in simple mathematical operations and vocabulary skills.	Preferred language English OR IsiZulu	Broad: Quantitative knowledge; Processing speed; comprehension knowledge. Narrow: Mathematical knowledge, mathematical achievement; perceptual speed, rate of testing, number facility, reading speed; Language development

APPENDIX C. Bilingual Battery for L-B LD Scoring and Interpretation

Subtest Description	**Units**	**Scoring**	**Error analysis**	**Plan for intervention**
SECTION A: LISTENING SKILLS A1 Following auditory directions (English) A2 Following auditory directions (isiZulu)	A1 and A2: 10x English directions 10 x isiZulu 10 sets of pictures per test, 4 pictures per row.	1 point per correct item 0 score per incorrect item T=10 English T=10 isiZulu	1. Score of 0-5 Shows inadequate comprehension of instruction. 2. Score difference between English and isiZulu subtests Shows difficulty with one language? English or isiZulu? 3. Score of less than 5 (50%) in both subtests shows inadequate skill in listening or a general inability to follow directions due to other factors such as poor hearing or inattention.	1. 1.Improve Vocabulary in the weaker Language 2. Exclude concomitant disorders such as ADHD, Hearing loss, CAPD. 3. 3. Improve listening skills.
SECTION B: LANGUAGE SKILLS B1 Story comprehension (bilingual) B2. Word association and reasoning	**B1:** 12 items per grade Baseline: item 1 Ceiling: none **B2:** 20 items ; 20 x receptive and 20x	**B1:** 1 point per correct item 1 point for English and 1 point for isiZulu 0 per incorrect item T= 12 **B2:**	1. Score of 0 shows the learner is unable to understand the story without illustrations or further explanation of terms? 2. Score difference between English and isiZulu subtests Shows difficulty with one language? English or isiZulu. 3. Score of less than 3 (50%) in both subtests shows inadequate skill in comprehension, poor auditory sequencing due to other factors such as poor attention or memory. **B2:**	1. Improve general comprehension skill. 2. Improve vocabulary in the weaker language 3. Exclude concomitant auditory perceptual difficulties. 1. Improve categorizing and word association skill. 2. Improve expressive

	expressive=40 Baseline: item 1 Ceiling: 5 consecutive errors	1 point per correct item 1 point for Receptive and 1 point for expressive 0 per incorrect item T= 40	1. Total Score of less than 20 (50%) in both elements shows inadequate skill in categorization or association and language reasoning skills. 2. Score difference between Reasoning and Association shows difficulty with the receptive or expressive language skill involved. 3. Score of less than 50% in reasoning element alone shows that the learner is unable to understand the association and may have poor receptive language. 4. Score of less than 50% in Association may explain poor expressive language skills including vocabulary, word categories.	language skills including reasoning.
SECTION C: READING and SPELLING SKILLS C1 Phonological awareness (bilingual) C2 Letter awareness (bilingual) C3 Rapid automated naming C4 Reading and doing	**C1**: 35 items **C2 :** 5 items **C3:** 3 items Item A has 41 units Item B has 24 units Item C has 24 units Time recording **C4:** 5 items Time recording	**C1**=35 **C2**: =5 **C3:** 3, 2 or 1 score per item **40=3** **20-39=2** **10-19=1** **<10=0** B and C= 3 point per whole item.	1. 100% indicates that phonological awareness has been established. 2. 50% or more shows adequate phonological awareness but has not mastered the skill. 3. Less than 50% shows inadequate experience or knowledge with PA tasks. 4. Shows potential to learn after a trial item/ demonstration. **C2:** 100% indicates ability to read on their own. C3: 1. 100% indicates ability to complete the RAN task within the expected time limit for age/ grade? 2. 50% or more shows emerging or poor skills. 3. Less than 50% shows lack of relevant skills **C4**: 4. Discrepancy in scores between reading and doing may indicate poor reading comprehension if score	1. Target each weak skill in phonological awareness separately. 2. Use Pseudo-words to facilitate learning of the skill in both isiZulu and English. 3. Provide an opportunity to practice tasks. 4. In-depth assessment of reading skills using another tool. 5. Improve reading fluency and comprehension. 6. Improve reading speed. 7. Match reading and spelling outcomes to

		3=24 items **3=12-23 items** **1=<12 items** **0=0** **C4**: 2 points per item; 1=Reading fluency 1 = Doing/ comprehension =10	is in favour of reading. 5. Fluency noted qualitatively Time recording= Language processing speed; Type of Errors noted	therapy goals.
SECTION D: **WORKING MEMORY** D1 Repeating digits, answering questions. D2 Repeating letters & remembering colours. D3 Repeating words D4 Backward combined sequences	**D1-4**: 6 items each= 24 units	**D1-D3** 1 score per unit, total score per item is 2 Subtest total = 12 **D4:** Score 1 per correctly recalled unit. 3 scores per item=18	1. Learner demonstrates problem with short term sequential memory if they fail to recall immediately digits or letters or words. 2. Learner has working memory difficulties if they can recall test items but cannot answer the question or complete the second part of the instruction= remember 2 to 3 items in a sequence. 3. Score of < 6= learner has a moderate problem with sequential memory as s/he can only recall 4 or less items in a sequence. 4. Score of 8 or more demonstrates adequate sequential memory for children in grades 1, 2 and 3. 5. Discrepancy in performance across the tests indicate a preference for digits, letters or words.as the learner would find it easier to remember digits vs letters vs words.	1. Improve short term memory 2. Improve working memory with delayed recall and interference. 3. Target digits, words and speech sounds or letters separately.
SECTION E MATHEMATIC	10 items per subtest Section total =30	1 point per question/ unit,	1. E1: A 100% score shows that the learner understand the positional, size and other concepts and vocabulary used in Math e.g.	1. Improve language concepts, vocabulary, syntax and

CONCEPTS E1 Numerical vocabulary E2Problem solving E3 Word sums		0 score for no or incorrect response Subtests total 30	**days/ 1st, 2nd, 3rd, 4th/ before and after?)** 2. E2: A 100% score shows the learner demonstrate sequential and working memory of the problem presented and has the basic ability to solve numerical problems such as addition and subtraction? 3. E3: A 100% score shows adequate vocabulary and the ability to integrate receptive vocab, sequential memory and problem solving in order to solve numerical problems. 4. A 50% score indicates partial fulfilment of skills.	comprehension. 2. Match Math outcomes to Therapy goals 3. Improve working memory and RAN
Total sub-tests=15	Total items=174	Total score=292		

APPENDIX D. Error Analysis Guideline

Subtest	**Raw score**	**% correct**	**Explanation of Error analysis**
Section A listening skills A1 Following auditory directions (English) A2 Following auditory directions (isiZulu)	A1 Score: T=10 A2 Score: T=10	Section T=20 % %	○ Shows adequate ability to follow direction ○ Shows inadequate ability to follow directions ○ Shows difficulty with one language? ○ English or isiZulu? ○ Shows inadequate skill in general ability to follow directions **Positive Indicators for L-B LD**
Section B: Language Skills B1 Story comprehension (bilingual) B2 Word association and reasoning (isiZulu)	B1 Score: T=12 B2 Score: T=20	Section T= 32 %	○ The learner is able to understand the story without illustrations or further explanation of terms? Yes/ No ○ Shows understanding of the questions? Yes/ No ○ The learner requested help / repetition? Yes/ No ○ Is the learner able to understand and explain the association of words? **Positive Indicators for L-B LD**
Section C: Reading And Spelling Skills C1 Phonological awareness (bilingual) C2 Letter awareness (bilingual) C3 Rapid automated naming C4 Reading and doing (English / isiZulu)	C1 Score: T=35 C2 Score: T=5 C3 Score: T=3 C4 Score: T=5	Section T= 48 %	○ Shows adequate/ inadequate experience with PA tasks yes/ No ○ Shows potential to learn after a trial item/ demonstration yes/no ○ Shows weak/ strong PA skills ○ Able to read on their own? Yes/ No ○ Able to complete the task? Yes/ No ○ Required help with reading or understanding the concept? Yes/ No **Positive Indicators for L-B LD**
Section D: Working Memory D1 Repeating digits D2 Repeating letters/colours	D1 Score: T=6 D2 Score:	Section T= 24	○ Does the learner demonstrate memory of the problem presented? Yes/ No ○ Can the learner understand the sequence of backward and forwards? Yes/ No ○ Is the learner finding it easier to

D3Repeating words backwards D4 Memory sequences	T=6 D3 Score: T=6 D4 Score: T=6	 %	remember digits? Letters? Words? **Positive Indicators for L-B LD**
Section E Mathematic Concepts E1 Numerical vocabulary (English / isiZulu) E2 Numerical problem solving (English / isiZulu) E3 word sums (English / isiZulu)	E1 Score: T=10 E2 Score: T=10 E3 Score: T=10	Section Total =30 %	○ Does the learner understand the vocabulary e.g. **days/ 1st, 2nd, 3rd, 4th/ before and after?)** ? Y/ No ○ Does the learner demonstrate memory of the problem presented? Yes/ No ○ Does the learner show ability to calculate? Add/ subtract/ divide? **Positive Indicators for L-B LD**
Combined Total score:		**%**	**Total No of Positive Indicators for L-B LD:**
Test total	**154**		**Is there any indication of codeswitching, language mixing, interference, language loss in L1, silent period?**

APPENDIX E. Learner Behaviour Assessment

General presentation	Well	Passable	Poor
Attention: How did the child settle for the tests?	Good	Ave	Poor
Concentration through the tests: Did the child concentrate throughout the testing?	Good	Ave	Poor
Mood: Was the child fully cooperative during the testing?	Cheerful	Neutral	Withdrawn
Comprehension: Did the child seem to understand the instructions well?	Well	Repeated instructions	Lacked understanding
Speech: Did the child speak clearly during the testing?	Clear	Generally clear	Unintelligible
Did the child use another language in addition or in place of isiZulu during testing	English	IsiZulu only	Other:
Unusual behaviours	None	Some odd	Explain:

APPENDIX F Delphi Panel Evaluation of the Tool (Final Iteration)

Dear participants

The Bilingual language Battery has been developed following feedback from you whilst the tool was tried. Please mark in the box to indicate whether you agree/ not with the point in questions. Lists of responses are summarised from previous interaction with all of you in the past two years. The tool development

1. **Test content**
   A. **Mark whether you find the subtest valuable or not for inclusion in a bilingual language battery for LLD**

Test subtest	**Strongly agree**	**Agree**	**Disagree**	**Strongly Disagree**
1. Following directions in isiZulu				
2. Following directions in English				
3. Story comprehension in English and isiZulu				
4. Word Association				
5. Phonological awareness				
6. Short term memory				
7. Working memory				
8. Reading and doing				
9. Missing Phoneme				
10. RAN- picture naming				
11. RAN- pseudo words				
12. Math vocabulary				
13. Math problem solving				
14. Word sums				

B. Is there another area of content you would have liked to be included? Please state why:

_____

_____

C. The spelling test was removed from the tool due to a comment that therapists do not need to assess spelling in that manner since they focus on underlying skills. This had word lists for each grade and would have informed of the leaner's abilities in written language.

Do you agree with that statement? _____

Is there adequate information in the test to provide information about the learner's ability in written language?

_____

D. Rhyming was not assessed. Literature review indicated the difference between isiZulu and English Rhyming which indicated that rhyming is not an early learnt skill in isiZulu as it involves a whole word e.g. "ubaba-umama" and mainly sentence based. Please answer the following questions regarding rhyming with **Yes or No**.

a) Rhyming should have been included in its simplest form.
b) Information about Rhyming is not as important in isiZulu as it is in English.
c) There needs to be more research in the area of rhyming in isiZulu.

E. Working memory

The results from the trials proved this test to be the worst in terms of scores for all grades in the 5 schools tested. Modifications to the usual tasks of repeating digits, letters or sounds and words had to be done. Considerations for grading and language were difficult to achieve due to the nature of the task. Please look at the modified test and comment.

a) Does it achieve the goal of assessing the memory skill and not vocabulary knowledge?
b) Does it achieve the goal of assessing not just short term memory but working memory?
c) What other suggestions would you have?
_____
_____
d) Recommendations for future work in this area?

_____

_____

_____

2. Test structure

Please look at the test and comment on the general tool structure. Mark your answer in the following table. Add a comment or suggestion 1 below the table.

	Strongly agree	**Agree**	**Disagree**	**Strongly disagree**
1. The number of subtests is adequate				
2. The length of each test is adequate (average length is 10 items)				
3. The instructions for administration are clear				
4. Two trials and two examples are adequate				
5. There is balance in terms of skills assessed is achieved i.e. listening, expression, comprehension, reading, math language				
6. The tasks are easy to understand and to administer				
7. The subtests available in English and isiZulu are adequate.				
8. The error analysis column is helpful				
9. The provision of possible answers is a useful guide				

3. Language considerations

The test aims to assess the learner's performance in English and compares it with her performance in isiZulu to make a decision about the reason for poor performance in listening, expressive language, comprehension and math. The

What are your thoughts on the language usage in the battery?

_____

_____

Each subtest and items were carefully considered for linguistic appropriateness in the areas where trials took place i.e. KZN inlands - Newcastle, North coast –Empangeni and in Durban Metro.

Is there anything of concern regarding dialectal considerations?

_____

_____

Any suggestions for further changes, future research?

_____

_____

4. Cultural considerations

Attempts were made to make the tool firstly appropriate for South African learners in grades 1, 2, 3; appropriate for use in bilingual English-isiZulu learners and for those learners who speak mainly isiZulu or educated in isiZulu whilst they are exposed to English through school and media. The pictures were previously criticised as they are cartoon and fantasy based however in trials the pictures were found to be clear and unambiguous. Please answer the following questions regarding cultural appropriateness.

	Strongly agree	**Agree**	**disagree**	**Strongly Disagree**
1. Test items are familiar to SA children				
2. Test pictures are acceptable for SA children				
3. Use of Graded items are necessary				
4. Graded items show adequate progression				
5. Math based items are fairly represented				
6. The use of pseudo words is appropriate for isiZulu speakers				
7. The use of isiZulu as an alternative on the memory subtest is appropriate				
8. This tool can be easily modified to another South African language without much changes to the structure or pictures				

Other suggestions regarding cultural considerations for this tool?

_____

_____

Suggestions for future research?

_____

_____

Thank you so much for participating in this process

Xoli

APPENDIX G. Cycle 1 Item Pool Modifications

Section	Subtests	Picture use	Response per grade	Problems/comments	Suggested changes Pilot study and Delphi 1ST cycle
A Listening skills	A1. FAD English	Y	Appropriate for 1-3		none
	A2. FAD isiZulu	Y	Appropriate for 1-2	The isiZulu subtest was too easy for grade 3 learners.	Change the order of pictures to increase complexity and problem solving
	A3. Story comprehension	N	All items well understood with new phrasing and why question.		
B Language skills	B1 word association	N	Positive responses to smaller number of items.	Items do not tell enough of the child's expressive vocab.	Add a line for transcription of the answer to allow for analysis of the child's reasoning and expressive language skills including MLU.
C. Reading skills: C1. read and Do	Grade 1	Y	Too difficult for term 1 in grade 1 and grade 2 in an isiZulu medium school.	Learners could only read sight words practiced at school. Too much variability between school 1, 2, and 3 in terms of pattern of learning/ teaching phonics.	Add a Zulu word list; Indicate words appropriate for term 1, 2 and 3; use only frequent sight words.
	Grade 2	Y	Too difficult for grade 2 in an ESL school despite their use of English as home language.	Learners in a ESL school failing dismally on this test	Discuss plan with teachers in each school

	Grade 3	Y	Inappropriate for learners in a ESL school despite use of English as home language	Learners in a ESL school failing dismally on this test	Discuss with HOD/ subject head. Use class tests as a standard.
C2. Phono Awareness	C2.1 Segmentation	N	Appropriate gr1-3	Learners unable to complete the test without first teaching them the skill	Use nonsense words; use two trial items.
	C2.2. Substitution	N	Challenging for gr 1-3	Learners could not identify with isiZulu sounds as they cannot read or write them.	Use nonsense words
	C2.3 Similar sound detection	N	Response fair with isolation of nonsense words		
	C2.4 Similar sound/syllable production	N	Response poor	students seem not to have previous exposure to the skill	Adjust to blending and deletion tasks
C3. Repeating sequences	C3.1. Digits	N	Appropriate		
	C3.2. letters	N	Appropriate as letter names are used	Letter names allow for uniformity.	Use letters not sounds
	C3.3. Words	N	Appropriate		
	C3.4. Backward combinations	N	Appropriate	Scoring 1 point for 3 items too strict, results to low scores.	Allow a point per item.
D Writing/ spelling	Grade 1	n/a	Appropriate for term 3	Word list not following teaching sequence for sounds	Change banana as 1st target word, allow use of teaching sequence for sounds
	Grade2	n/a	Appropriate Word list	Most learners could not spell bubble. Test not allowing for direct assessment of core spelling skills.	Change format of the test to assessment of core skills
	Grade 3	n/a	Appropriate word list		Change format of the test to assessment of core skills.
	isiZulu	n/a	Appropriate for isiZulu 1st language speakers in gr2 and3	Too difficult for isiZulu speakers who cannot read/ write in isiZulu	Only use for speakers in isiZulu medium schools.
E. Math	E1 Math problem	N	Appropriate with translation of		Check degree of difficulty

Language concepts	solving		instruction to isiZulu		
	E2 Numeric words	N	Appropriate for gr 1-3 with added item of recalling days of the week		Ask learner to first recall the days of the week; Remove question 5.
	E3 Word sums	N	Appropriate for all grades		
	E4 Math vocab	Y	Appropriate for all. Administered first	Good to administer it first	administer this test first to indicate if the learner can proceed to the next level

APPENDIX H. Cycle 2 Item Pool Modifications

Section	Subtests	Pause	Response per grade	Problems/comments	Suggested changes Delphi 3rd cycle
A Listening skills	A1. FAD English	Y	Appropriate for 1-3		
	A2. FAD isiZulu	Y	Appropriate for 1-2	The isiZulu subtest was too easy for grade 3 learners.	Add 4th pictures to adjust level of difficulty
	A3. Story comprehension	N	Appropriate for all 3 grades Nursery rhyme adaptations were acceptable.	Question 1 grade 1 often misunderstood and needed rephrasing; Most learners performed poorly on the Inferencing item	Change to a why question
B Language skills	B1 word association	N	Vocabulary differences for item 5 and 14	Most grades 1, 2 could not proceed beyond 14 due to the number of options (4) to remember. Limited information obtained on the receptive skill. Random number of items.	Allow English versions of the word. For an example, indlulamithi or giraffe. Cut items to 10 for grade 1-2 and to 15 for grade 3 or start grade 3 learners at a later item.
	B2 Nonsense words	N	Appropriate for 1-3	Nonsense word repetition was easy for all grades. The testers assumed English rules for pronunciation of these words.	Move this section to phonological awareness section, Expand use of nonsense words.
C. Reading	Grade 1	Y	Too difficult for term 1 in grade 1. Random	Learners could not read words that began with letters other than b and m sentences	Matching activity to draw a line from a word to the picture. Use words

skills: C1. read and Do			placement of single pic		from each learner's book as each school uses a different series of books
	Grade 2	Y	Appropriate.	3 minutes was adequate	
	Grade 3	Y	Appropriate. 3 options per row	3 minutes was adequate for able readers.	
C2. Phono Awareness	C2.1 Segmentation	N	Appropriate gr1-3		
	C2.2. Substitution	N	Challenging for gr 1-3	Learners could not identify with isiZulu sounds as they cannot read or write them.	Use of a page to teach or demonstrate the skill or use pseudo words to assess the skill.
	C2.3 Similar sound detection	N	Challenging for gr1,2		Use pseudo words
	C2.4 Similar sound/syllable production	N	Challenging for gr 1-3		Use pseudo words
C3. Repeating sequences	C3.1. Digits	N	Appropriate		
	C3.2. letters	N	Appropriate as letter names are used	Letter names allow for uniformity.	Use letters and sounds depending on the school's system
	C3.3. Words	N	Appropriate		
	C3.4. Backward combinations	N	Appropriate	Scoring 1 point for 3 items too strict, results to low scores.	Allow a point per item.
D Writing/ spelling	Grade 1	n/a	Appropriate for term 3	Word list not following teaching sequence for sounds	Remove the spelling tasks, add a letter awareness task
	Grade2	n/a	Appropriate Word list	Too much variability among the 3 schools	Remove the spelling task, add Rapid automated naming
	Grade 3	n/a	Appropriate word list	Too much variability among the 3 schools	Remove the spelling task ; add the decoding task using nonsense words
	isiZulu	n/a	Inappropriate for learners using English	Too difficult for isiZulu speakers who cannot read/ write in isiZulu	Remove the spelling task.

			as home language though they speak isiZulu fluently		
E. Math Language concepts	E1 Math problem solving	N	Appropriate	Translation to isiZulu : what do you need for – to become--	Require a couple of illustrations.
	E2 Numeric words	N	Appropriate for gr 1-3		Score correct recall of days of the week
	E3 Word sums	N	Appropriate with illustration/ trials		
	E4 Math vocab	Y	Appropriate for all	Good progression of testing	

APPENDIX I. Cycle 3 Item Pool Modifications

Section	Subtests	Picture use	Response per grade	Problems/commence	Suggested changes Delphi 5th cycle
A Listening skills	A1. FAD English	Y	Appropriate for 1-3	Poor grading	Order by level of difficulty
	A2. FAD isiZulu	Y	Appropriate for 1-2	Poor grading	Order items by level of difficulty
	A3. Story comprehension			More of a language assessment	Move to B section
B Language skills	B1 Story comprehension	N	Appropriate for all 3 grades Nursery rhyme adaptations were acceptable.	Check familiarity with the stories. Most learners performed poorly on the Inferencing item.	Assess in both English and isiZulu
	B2 word association	N	Vocabulary differences for item 5 and 14	Note dialectal choices	Note choice of vocab in response
C. Reading skills: C1. read and Do	Grade 1	Y	Task adjusted to single words. Random placement of single pics	Not adequate accommodation of isiZulu speakers in assessing reading skills.	New pictures for grades 1 and 2 for all 5 items.
	Grade 2	Y	Inappropriate for isiZulu main language learners.	Grade 2 tasks also too difficult for non-English speakers.	Simpler sentences for grade 2 level, available in both isiZulu and English. Added pictures
	Grade 3	Y 3 options per row	Appropriate	No accommodation for isiZulu main language learners.	Translated the task to isiZulu
C2. Phono	C2.1 Segmentation	N	Appropriate gr1-3	More accommodation for isiZulu	Use pseudo words

Awareness				speaking learners	
	C2.2. Substitution	N	Challenging for gr 1-3	Learners could not identify with isiZulu sounds as they cannot read or write them.	Use pseudo words
	C2.3 Similar sound detection	N	Challenging for gr1,2	Change task to isolation at word initial and final positions	Use pseudo words. Adjust sequence of items according to level of difficulty.
	C2.4 Similar sound/syllable production	N	Challenging for gr 1-3	Change task to isolation of middle sounds	Use pseudo words
C3. Repeating sequences	C3.1. Digits	N	Appropriate		
	C3.2. letters	N	Appropriate as letter names are used	Letter names allow for uniformity.	
	C3.3. Words	N	Appropriate	No accommodation for isiZulu main language speakers	Use isiZulu words as alternative available commercially
	C3.4. Backward combinations	N	Appropriate	Scoring 1 point for 3 items too strict, results to low scores.	Scoring adjusted
D Writing/ spelling	Grade 1	n/a	Appropriate	Letter awareness good but pictures inappropriate	Adjusted pictures
	Grade2	n/a	Appropriate Word list for L2	Adjusted word lists, RAN tasks appropriate, add isiZulu word list	Adjusted pictures
	Grade 3	n/a	Appropriate word list for L2	Accommodate isiZulu L1	Adjusted pictures
	isiZulu	n/a	Adjust syllable length	Too long	Use same pictures but create a new list to accommodate for same syllable length
E. Math Language concepts	E1 Math problem solving	N	Appropriate	Translation to isiZulu : what do you need for – to become--	Changed instruction
	E2 Numeric words	N	Appropriate for gr 1-3	Pilot scores= task Too easy	Add to section E1
	E3 Word sums	N	Appropriate with illustration/ trials	Allow for translation	Standardise translation
	E4 Math vocab	Y	Appropriate for all	Good progression of testing	Allow for translation

APPENDIX J. Permission to Conduct the Study in DOE Institutions

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Nomangisi Ngubane Tel: 033 392 1004 Ref.:2/4/8/323

Mrs XI Mazibuko
P.O. Box 8838
Richards Bay
3900

Dear Mrs Mazibuko

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"THE CONSTRUCTION AND VALIDATION OF A DIAGNOSTIC BATTERY FOR THE ASSESSMENT OF LANGUAGE LEARNING DISABILITY IN ISIZULU SPEAKING CHILDREN",** in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 01 December 2014 to 31 December 2015.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Connie Kehologile at the contact numbers below.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report / dissertation / thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education

    Uthungulu District and Amajuba District

Nkosinathi S.P. Sishi, PhD
Head of Department: Education
Date: 24 November 2014

KWAZULU-NATAL DEPARTMENT OF EDUCATION

POSTAL: Private Bag X 9137, Pietermaritzburg, 3200, KwaZulu-Natal, Republic of South Africa
PHYSICAL: 247 Burger Street, Anton Lembede House, Pietermaritzburg, 3201. Tel. 033 392 1004
EMAIL ADDRESS: kehologile.connie@kzndoe.gov.za / Nomangisi.Ngubane@kzndoe.gov.za
CALL CENTRE: 0860 596 363; Fax: 033 392 1203 WEBSITE: WWW.kzneducation.gov.za

APPENDIX K. Research Assistant Training Evaluation Form

TO BE FILLED BY THE RESEARCHER FOR EACH RESEARCH ASSISTANT AFTER THE TRAINING SESSION

Rate of 1-5

1= very poor

3=average

5=very good

AREA	**Very poor**	**Poor**	**Average**	**Good**	**Very good**
1. Keeping the learner motivated	1	2	3	4	5
2. Use of Encouraging comments	1	2	3	4	5
3. Consistency	1	2	3	4	5
4. Sense of teamwork	1	2	3	4	5
1. Inter-tester differences	1	2	3	4	5

APPENDIX L. Teacher Questionnare

Section A. Listening Skills	**Yes or N0**	
1. Has trouble paying attention.		
2. Has trouble following spoken directions in English. (*FE)		
3. Has trouble following spoken direction in isiZulu. (*FZ)		
4. Has to ask people to repeat what they have said.		
5. Has trouble understanding new ideas.		
6. Has trouble understanding facial expressions, gestures or body language.		
SECTION TOTAL		

Section B. Speech and language		
7. Has unclear speech.		
8. Has trouble answering direct questions in a story delivered in English? (*SC)		
9. Has trouble asking questions for clarity.		
10. Has trouble answering direct questions in a story delivered in isiZulu? (*SC)		
11. Has trouble thinking of (finding) the right word to say in English.		
12. Has trouble describing the answer relating to a story in English. (* SC)		
13. Has trouble describing the answer relating to a story in isiZulu. (* SC)		
14. Has trouble making inferences from a story. (* SC)		
15. Has difficulty matching words that have the same meaning in English (synonyms).(* WA)		
16. Has trouble identifying opposites. (*WA)		
17. Has trouble with classifying (putting items according to categories e.g. fruit, clothing). * (WA)		
18. Has trouble saying something another way when someone doesn't understand.		
19. Has difficulty answering the question "why" (*WA)		
SECTION TOTAL		

Section C. Reading (Phonological Awareness)	**Yes or No**	
20. Has trouble with isolating sounds when reading. (* PA)		
21. Has trouble blending sounds when reading. (* PA)		
22. Has trouble identify sounds in the middle of the word? (* PA)		
23. Has trouble identifying sounds at the end of the word. (*PA)		
24. Has trouble substituting sounds in any position of the word. (*PA)		
25. Has trouble following written directions.(* Read and Do)		
SECTION TOTAL		

Section D: Written Language	**YES/ NO**	
26. Has trouble with informal spelling. *		
27. Has difficulty filling in missing letters.*		
28. Has trouble with rapid picture naming.(* RAN)		
29. Has trouble with rapid word reading. (*RAN)		
30. Has trouble with nonsense words. (* RAN)		
SECTION TOTAL		

Section E: Short term and Working Memory		
31. Has trouble with recalling information recently provided. (*STM)		
32. Has difficulty recalling spelling sounds. (* RL)		
33. Has difficulty recalling words.(* RW)		

34. Has trouble with recalling numbers.(* RN)		
35. Has trouble with recalling information in another order/ sequence. (*RB)		
36. Has trouble with nonsense words. (* RAN)		
SECTION TOTAL		

SECTION F: Numeracy

	YES/ NO	
37. Has difficulty understanding numeric vocabulary e.g. smaller, more, double. (*NW)		
38. Has difficulty with numeric concepts e.g. subtracting, time tables (*MPS)		
39. Has trouble with problem solving in numeracy.(* MPS)		
40. Has trouble understanding word sums. (*WS)		
TOTAL		

Are there any other difficulties that the child presents with?